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PILOT SUPPLY AND TRAINING

HEARING

BEFORE THE

SUBCOMMITTEE ON AVIATION

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

PILOT SUPPLY AND PILOT TRAINING

AUGUST 3, 1989

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PILOT SUPPLY AND PILOT TRAINING

THURSDAY, AUGUST 3, 1989

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
SUBCOMMITTEE ON AVIATION,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:34 a.m., in room SR-301, Russell Senate Office Building, Hon. Wendell H. Ford (chairman of the subcommittee) presiding.

Staff members assigned to this hearing: Carol Carmody, professional staff member; Steve Palmer, senior professional staff member; and John Timmons, minority professional staff counsel.

OPENING STATEMENT BY SENATOR FORD

Senator FORD. If Senator McCain is on his way, I will make my statement, allow him to make his statement, and then get to our first two witnesses.

We have convened this morning to hear testimony about the supply and training of pilots. In the booming aviation industry, there is a present and continuing demand for skilled pilots. The recent events in Sioux City demonstrate once again how skill and experience in the cockpit can save lives.

I think yesterday afternoon's experience in North Carolina also indicates again the importance of skill and experience in the cockpit. We must be sure that pilots continue to get training and seasoning necessary to operate the commercial and general aviation fleets.

All indications are that within the next few years, we will have a shortfall of several thousand pilots in this country. In the past, the military has been the primary source of pilots. In fact, last year, 69 percent of the hires at major airlines were ex-military pilots. The fact that these pilots are drawn to the civil sector by higher pay and more attractive hours pose a real problem for the services.

Last evening, we extended the term of service of those who have gone to the academies by one year; and agreed to study the extension by 2 more years, which will be 8 years. We will hear more about that today from the Air Force.

Nevertheless, the military can no longer supply all the pilots needed in the civil sector. I am not sure that the current methods of training can meet this demand either. I am concerned that the number of experienced pilots is shrinking and replacements are not there.

The average hours of flight time for pilot hires has decreased from over 4,000 hours in 1987, to 3,600 in 1988. The percent of

pilots hired with less than 2,000 hours has increased from 11.7 percent in 1987, to 15.5 percent in 1988.

Requirements for pilots to have a college degree have been waived; promotions to captain are much more rapid. Those of us involved with aviation wonder how much further standards can be reduced before we stop. To get the experienced pilots, you need to pump up the pipeline or beginners. Flight training is expensive, and many who would like to be pilots do not have the means.

This is reflected by statistics. Student pilot applications are down 30 percent over the last 15 years. Commercial pilot certificates are down over 50 percent in the same period.

In the last session of the Congress, the Senate passed an amendment which would have extended veteran's benefits to eligible veterans for flight training. The amendment was struck down, however, in conference. Somehow we need to find a way to train pilots in the quantity and quality, and with the skills needed to continue to assure the flying public of the safest possible operations.

Senator McCain and I hope to hear today from the witnesses how the problem is being addressed, and how we might help.

Before I recognize the two witnesses, my distinguished friend is here, the ranking member, Senator McCain. And if you have an opening statement, we would be very pleased to have it at this time.

OPENING STATEMENT BY SENATOR McCAIN

Senator MCCAIN. Thank you, Mr. Chairman.

Mr. Chairman, I want to personally thank you for taking the time of this subcommittee on this very important issue. As we all know, there is a variety of very important issues and perhaps more of them in the future that fall under the responsibilities and oversight of this subcommittee. And this issue is a very important one to me personally, and I am grateful for your assistance and commitment to trying to get some resolution to this issue.

Mr. Chairman, I would like to start out by showing you an advertisement that was in the Stars & Stripes, Monday, July 31, 1989. The Stars & Stripes, as you know, is a newspaper which is distributed to members of the military, although I do not believe it is an official newspaper of the Department of Defense. A half-page ad that says: Pilots, this is your road to success. We are looking for exceptional men and women, et cetera.

And it tells about what the qualifications are for Eastern Airlines. It says: Effective August 1, Eastern plans to increase its starting salary for new pilots to $27,500 a year, highest in the airline industry; additional bonus and compensation of up $6,000 is also paid during your first year. We offer a rapid promotional opportunity for captain, et cetera, et cetera.

In the Armed Services Committee this year, as a member of the Manpower and Personnel Subcommittee, we put in, and I am sure that the House will accept a substantial increase in flight pay and bonuses for our military pilots. Obviously, the airlines are now reacting. And they will react by upping the ante. And they can do that with a board meeting; we have to do it through a legislative cycle.

So, I think that this——

Senator FORD. They will beat us every time at that, too.

Senator MCCAIN. I think so, Mr. Chairman. And it seems to me that we have got to break this cycle, and we have to look at new and innovative ways to do so. This hearing today will provide us, I believe, with some very valuable and important ideas as to how we could pursue that.

And I would like to also mention before I get into my prepared statement, I see no way, very frankly, that we will address this problem unless there is some financial involvement by DOD and the airlines. That is about as far as I have gotten. And I hope that our witnesses will be providing us with not only information, but previous experiences that they have had in the efforts of training pilots in the nonmilitary environment.

Mr. Chairman, in the 1990's, air travel will continue to expand. In 1980, there were 330 million airline passengers; the figure increased to 475 million by 1987. It is predicted to grow to 750 million by the year 2000. The financial benefits have been well documented, as have been the transportation benefits.

However, these projections depend on the presence of an adequate number of sufficiently trained pilots, and we have seen just yesterday and the day before, in the recent weeks, the absolute importance of having professional pilots of the caliber that we had in that recent 737 incident, where lives were saved because of, I think, the outstanding capabilities and professionalism of the pilots in the cockpit.

As we all know, in the past decade, and in fact, since World War II, the military has supplied the majority of the pilots for commercial airlines. It is becoming increasingly burdensome for the military to supply the commercial airlines with pilots. It costs between $4 million and $6 million to train a military pilot. This cost will only rise in the future. This is happening when every indication is, we will face an ever-tightening defense budget in the next decade.

From the point of view of national security, we can longer depend on the military to supply our commercial airlines with pilots.

Present civilian aviation training classes do not hold out much hope for assisting in this area. The number of students in civilian pilot training classes decreased 4.5 percent a year between 1980 and 1988. The number of processed student pilot certificates has fallen from 121,543 in 1972 to 86,000 in 1987.

I am encouraged by the response of the airlines, who have apparently recognized this problem and have begun to invest in in-house pilot training by affiliating with universities. The FAA's 3-year study to update its current requirements for pilot training is also a welcome development. I am not sure, though, that we can rely solely on these programs.

One possible option would be to create a partnership between the Federal Government, the universities, and the airlines to construct a viable career path to the commercial cockpit, other than through the military. This could involve forms of federal funding.

I hope this hearing will address those questions that we have in this area. Perhaps it will propel us closer to a solution to the prob-

lems of civilian and military pilot shortages, which certainly will not lessen in the years ahead.

Thank you again, Mr. Chairman, for holding this hearing. And I will freely admit that we are just getting into it, but I also suggest that unless we have a hearing of this nature, it will be difficult for us to arrive at the conclusions.

Senator FORD. They cannot accuse us of not trying. So, we look forward to it.

Our first two witnesses this morning are Mr. John Kern, Acting Associate Administrator for Regulation and Enforcement, Federal Aviation Administration; Ms. Karen Keesling, Assistant Secretary for Manpower and Reserve Affairs, U.S. Air Force.

Mr. Kern and Ms. Keesling, what I would like for you to do is just go ahead and give your testimony and then we will ask each of you questions. Your full statements will be included in the record. If you want to highlight it, that would be fine.

STATEMENT OF JOHN KERN, ACTING ASSOCIATE ADMINISTRATOR FOR REGULATION AND ENFORCEMENT, FEDERAL AVIATION ADMINISTRATION

Mr. KERN. Thank you, Mr. Chairman, Senator McCain.

I am pleased to have this opportunity to appear before you today concerning the Nation's supply and training of pilots. This is a subject which affects us all in the aviation community. We all recognize that we may be facing a shortage in the numbers of adequately trained personnel available to staff our future civil aviation fleet.

For example, last year was the first year in which the United States scheduled air carriers hired more pilots from the general aviation sector than from the military. And we see no change in this trend.

Equally important, the cost of pilot training has increased to the point where the flow of new private pilots may be reduced.

We believe that innovation and flexibility in pilot training are important factors in assuring the adequate pool of qualified pilots.

In our view, cooperation among air carriers and general aviation, the academic training community, and the FAA as safety regulator, is an essential element to provide a climate for positive change in training and testing methods for pilots.

FAA is undertaking a number of efforts in the training area. FAA personnel are working cooperatively with the academic community to develop appropriate airway science curricula. We are also working on the modernization of our pilot training qualification regulations to remove impediments to flexibility, creativity, and productivity in training procedures.

We believe, for example, that we should continue to foster use of innovative training devices. The increased use of simulators and related training devices provides many advantages to the aviation community. Not only do they save costly fuel, but they provide an enriched training experience for pilots, particularly for procedures that could be risky in actual aircraft operations.

FAA has already taken steps to provide for the use of less costly training devices in commuter training programs. And we are con-

sidering further regulatory changes to provide for uniformity and efficiency in all levels of pilot and instructor training, where simulators and other advanced training devices may be used.

We seek continued benefits to pilot training from expanding use of simulators and the possibility of offsetting the length of experience—that is, flight hours—by adding quality of experience.

Through FAA's Airway Science Program, education specialists have assisted colleges and universities in developing aviation curricula and acquiring equipment to support aviation education.

For example, the acquisition of simulators and other such facilities at the University of North Dakota reflects one such cooperative effort among the university, the Federal Government, and an air carrier.

FAA's regulatory efforts to modernize pilot training requirements are the first major regulatory effort in this area since 1973. Many of these regulatory initiatives, which are underway at the FAA to modernize flight crew training procedures, reflect the recommendations of the joint government-industry task force on flight crew performance. The task force was established in August 1987, and its recommendations were issued in June 1988.

FAA personnel were among the members of the task force's steering committee and served on various working groups of the task force.

In order to understand exactly what air crew training should achieve, FAA conducted a complete, indepth review of the tasks required to operate an aircraft in the current aviation environment, and the knowledge and skills required to perform these tasks. This project is called job-task analysis.

FAA has been involved in a series of government-industry panels on this project and has produced a job-task analysis data base. We have made this data base available to the public for further analysis and comment.

The FAA also heard from a panel of industry experts on trends which will affect pilot training over the next 10 years. Further, we will hold four public hearings on this subject during the next 2 months. These will be held in Washington, Illinois, and California; and in Florida, in connection with the Aircraft Owners and Pilots Association meetings.

FAA is interested in the long view: requirements that will be placed on air crews as technology evolves into the next century. We will be studying aviation trends that affect crew requirements, so as to form a picture of the aviation environment to be faced by air crews by the year 2010.

The short run is being considered also. FAA has received a number of recommendations regarding pilot training from the National Transportation Safety Board. We published our position regarding these recommendations in a notice of proposed rulemaking, which appeared in the Federal Register on May 26. The comment period will close on August 24.

Most of these proposals concern increased recency of experience requirements; training curricula requirements for high-altitude flight; and airplane type ratings; increased training requirements for stalls; and, in the case of flight instructors, spins; a flight instructor endorsement for operation of tail-wheel airplanes; and sev-

eral amendments to pilot school regulations which are currently handled by exemption.

We are also involved in a major effort aimed at facilitating the use of advanced training media, technology, and methods. This effort begins with the Advanced Qualification Program [AQP], which was proposed in an NPRM last February. The comment period closed last April, and we are working on an evaluation of the comments.

The Advanced Qualification Program would simplify and enhance training procedures in a number of ways. A new training path under this Advanced Qualification Program would constitute an optional parallel path to training under existing requirements. The focus of this program is on ensuring actual proficiency in performing tasks, rather than on an arbitrarily, prescribed number of hours of experience.

A key element of the program provides for training in cockpit resource management. This involves leadership and crew coordination techniques, situational awareness, and the ability to use all available cockpit resources. And it also includes use of resources outside the cockpit.

The AQP would include training on simulators in which flights could not be aborted due to mechanical, weather or air traffic difficulties set up in the simulation. Any simulated flight which is begun would have to be completed, as in the real world. This is designed to enhance the psychological ability of air crews to face unexpected difficulties. The procedure is called "line operations flight simulation".

Current training procedures call for generalized training in maneuvers which some aircraft are not capable of performing. This would be eliminated in the revised procedures. The new procedures will be specifically designed to match each make, model and series of aircraft, and to reflect the maneuvers that a particular aircraft can perform.

We also contemplate ending the current approach of exempting the operation of private training centers—that is, training establishments not controlled by air carriers, such as those operated by Flight Safety International, by SimuFlite, or perhaps one of the colleges and universities involved in pilot training—and instead, authorizing and governing them directly by appropriate regulations.

In addition to the modernizing of training for commercial pilots, FAA has been modernizing the private pilot training process. The new recreational pilot certification program will insert a new rung in the training ladder above student pilot and below the private pilot certificate.

This program would recognize training involving about 15 hours of flight time, leading to recreational pilot certification.

The certificate would be oriented toward emphasizing basic flying skills in the areas which traditionally cause accidents. We hope that the availability of the new certificates, which should be less costly to achieve than a private pilot certificate, will induce more people to commence a flying career; we project that as many as 7,000 additional pilots may be encouraged to begin flight train-

ing each year as a result of this effort, with some benefits in the area of the commercial pilot shortage.

In conclusion, I would like to emphasize that the FAA views the provision of an adequate supply of air crews as a very important priority. To help achieve that necessary pool of pilots, FAA believes that training requirements should realistically and efficiently match the training technologies available, and should not serve as an impediment, either because of cost, or because of unnecessary requirements imposed on people learning to fly or seeking to achieve increased certification as a pilot.

We are committed to working with the aviation community and the academic community to provide programs which encourage young people to learn to fly, and which offer the best training possible to ensure a highly-qualified pilot community.

Mr. Chairman, this concludes my prepared statement. I will be pleased to answer any questions you may have later.

Senator FORD. Thank you, Mr. Kern.

Ms. Keesling.

STATEMENT OF KAREN KEESLING, ASSISTANT SECRETARY FOR MANPOWER AND RESERVE AFFAIRS, U.S. AIR FORCE

Ms. KEESLING. Thank you, Mr. Chairman and Senator McCain.

It is indeed an honor to appear before you today to discuss the Air Force's pilot shortage. Those of us appearing before you today share a common concern: the continuing availability of experienced pilots—a concern that may well require the concerted effort of all of us to remedy.

The military, and most particularly, the Air Force, is the single largest procurer and producer of pilots in the United States, yet we are currently losing 1,000 more pilots a year than we train, a loss counted in billions of dollars of training and experience with a potential to greatly affect our readiness posture.

We have not been standing idle; we have been aggressively pursuing many nonmonetary initiatives. Two worth mentioning, we have been taking pilots out of nonflying jobs, putting them back in the cockpit, and replacing them with nonfliers; and we have been placing primary emphasis on job performance and job proficiency by keeping pilots in the cockpit through most of their junior years.

In addition, congressional help with a pilot bonus and the current legislation in the Aviation Career Improvement Act of 1989, which, among other initiatives, would provide the first increase in aviation career incentive pay in 8 years, will certainly help.

However, we still estimate a shortage of 2,800 pilots in 1994. Our problem is not recruiting candidates, but keeping enough young, experienced pilots, many of whom we are losing to the airlines.

If compensation is the key, we are not in a position to compete with the airlines in a wage war, I think as described by Senator McCain.

Future demands for pilots in the national and international markets, approximately 50,000 each, will be driven by a peak in commercial airline pilot retirements and a projected increase in airline travel of 5 to 6 percent a year through the next decade.

Although the military is the biggest supplier of pilots to the airlines, we alone cannot begin to sustain these requirements, nor is there a centralized mechanism to channel experienced, newly graduated commercial pilots into the airlines.

As a result, and in closing, we in DOD would welcome any opportunity to work with the airline industry toward fashioning a long-term solution to the pilot shortage.

That concludes my statement.

[The statement follows:]

STATEMENT OF KAREN KESSLING, ASSISTANT SECRETARY FOR MANPOWER AND RESERVE AFFAIRS, OFFICE OF THE SECRETARY, DEPARTMENT OF THE AIR FORCE

Mr. Chairman and members of the committee, it is indeed an honor to appear before you to discuss the pilot shortage.

This shortage is one of the more critical issues facing the Nation today and will remain one of the Air Force's biggest challenges into the next century. The Air Force recruits in a highly competitive market, and spends millions of taxpayer dollars training new aviators. Our problem is not in attracting qualified candidates, but in retaining them past their initial commitment. If appropriate remedies are not found, we will have an Air Force pilot shortage of more than 2,800 by 1994 and will have lost several billion dollars in trained and experienced pilots.

The present environment is not transitory. Sustained airline hiring of at least 5,000 pilots per year to replace retirements and feed expansion has created a long-term demand for limited aviator resources. The airlines want the professional orientation and experience the disciplined military pilot offers. Consequently, in the past two years, over 50 percent of airline hires have been former military pilots--a trend we expect to continue. And we are not alone. Our experiences are shared internationally, by the armed forces of Canada, Australia, Great Britain and Spain, to name a few.

We need decisive action to improve retention and keep it healthy over the long term. We are pursuing a number of non-monetary initiatives that will help:

-- Emphasizing through the Officer Professional Development Program that duty performance and job proficiency are

the keys to success--to an aviator, that means for the first several years, he or she should focus on the primary job of flying.

-- Putting about 1200 pilots back into the cockpit by replacing them in non-flying jobs in the command post and base operations with non-rated personnel from the newly created Operations Management career field.

-- Increasing reimbursements for out-of-pocket permanent change of station expenses.

The Air Force has aggressively worked these initiatives to respond to specific concerns voiced by our aviators. But they are only a small part of a permanent solution. Any long-term solution must address several factors and principles the Air Force considers fundamental.

First, as stated earlier, our problem is not with procurement. Even with an eight year service obligation for completing undergraduate pilot training, there are more than enough qualified applicants to fill our training cockpits. We must work the problem to retain these pilots in whom we've invested millions of training dollars and years of experience. We do not expect or need to retain them all, but we do need to keep enough to meet requirements. Presently, pilots are leaving faster than we can train replacements. In FY89, the Air Force lost over 1000 more pilots than it produced in Undergraduate Pilot Training.

Second, we have insufficient active force cockpits and flying hours to train and season enough newly graduated student pilots to replace these losses unless we degrade our present combat unit

experience levels. Moving more active force structure into the Reserve Components, as some have proposed, would further reduce the training and seasoning base, and worsen the problem.

Finally, while the military services can never win a salary war with the airlines, we must recognize the increasing value of the pilot resource through higher compensation. Aviator Career Incentive Pay (ACIP) was instituted in 1974 with this in mind, but has lost purchasing power since 1981, the last time it was raised, when it was fixed at $400 a month. Aviator Continuation Pay, implemented 1 Jan 89, to pay fixed wing pilots between 6 to 13 years of service a bonus of $6,000 to $12,000 a year was designed a means of stemming the tide of exiting pilots. While it has not achieved the success we had hoped, it has caused some pilots to withdraw their separation dates. Our analysis shows that aviators view ACIP, if its purchasing power were restored, as the more important factor in the long-term, stable pilot retention equation as it would not only assist in improving retention while the bonus is in effect, but for the remainder of the officer's career. Consequently, the Air Force appreciates the Congress' responsiveness in approving and funding the bonus, as well as introducing an increase in ACIP as part of the Aviation Career Improvement Act of 1989. It shows that we have not lost sight of the need for a long-term solution for total aviator retention.

By all estimates, the nation will need between 4,000 and 8,000 pilots per year to supply military service and expanding commercial aviation requirements. The demand is too large for the military alone to provide enough trained and experienced pilots. We would welcome the opportunity to work with the airline industry toward resolving the pilot shortage before it erodes any further.

I will be happy to respond to any questions you would like to ask.

Senator FORD. Thank you very much.

Mr. Kern, you talked about several facets of the industry this morning. Let us start with commuters. Are you concerned that safety in the commuter industry will suffer as a result of hiring pilots with less experience than those that were hired in the past?

Because, as I see it, the commuter industry is growing, and each airline begins to build up its commuter system taking their passengers into a hub. You find the feeder of that hub increasingly has become a commuter, and they are hiring pilots with a lot less experience. I see that because I have to travel by commuter. It is not just one airline.

Are you concerned?

Mr. KERN. Senator Ford, there is no doubt, in my view, that the commuter airline industry is caught in this dilemma of the pilot shortage, probably worse than any other segment of the aviation community. The rapid growth, the supply, and then the demand from the other side from the large carriers, has put them in an unusual position.

The turnover rates at the commuter airlines are very high. And I will leave it up to the industry to tell you what the rates are, but they are significant.

The way the FAA has dealt with this is to take a second look at the training requirements that we impose on the commuter airline industry. And I can assure you that our training requirements over the past three or four years for that segment of the industry—through FAA's working with the industry—have been strengthened.

And of course, one of the reasons we have strengthened those requirements is because we have seen people entering that phase of the market with fewer hours and less experience. But the same basic regulatory requirements that we have had over the years, the same basic check ride requirements, have not changed. So that the people that finally make it through the training pipeline, that the commuters have within their own company, training that is approved by the FAA, we are not concerned about.

They are excellent pilots, they are safe pilots, and they perform well.

Senator FORD. Well, we want to talk about performance and pilot experience. I think we all look at accidents and what occurred at those accidents, and it seems to me that the United accident at Sioux City is a perfect example of crew working together. I think they just started out and got to a point where there was nothing in the book. Then they relied on their experience and ability. I believe you called that cockpit resource management. That is a good word.

That is about like a banker. Instead of giving his employees a raise, he gives them a new title.

But does the FAA require this training now for flight crews?

Mr. KERN. It is not a general requirement. There is no regulatory requirement for it right now. However, in approving the training programs for the major air carriers, we have made it a requirement, particularly those who use advanced simulation. So that airlines like United Airlines, Eastern, Continental, Northwest Airlines, American Airlines, have an approved cockpit resource management program.

And we believe, continuing on your remarks about the Sioux City accident and the similar one in Honolulu, where they did, in fact, run out of book procedures—you just cannot practice everything—we believe that the cockpit resource management training that the pilots received, being able to communicate and communicate effectively with the other people in the cockpit and outside the cockpit, in large part contributed to the success of those two operations.

Senator FORD. I mentioned earlier about the Piedmont 737, which made a couple of two-point landings, one to check it and one to go ahead and make it if they could. And I thought things worked out reasonably well. Can you give us any information about the crew, longevity, experience and so forth of the flight yesterday?

Mr. KERN. I do not have data on the crew, Senator. I would be happy to get it for you.

Senator FORD. If you would.

[The following information was subsequently received for the record:]

The captain was a 20-year employee with Piedmont. He had a civilian background; he had not been a military pilot prior to joining Piedmont.

Senator FORD. And we will probably read it in the paper tomorrow or something, because that seems to be one of the items that has come out in the Sioux City accident and others.

Mr. KERN. In fact, I can get that for you and have it within the hour probably.

Senator FORD. That would be fine.

Does the FAA plan to require that commuter airlines operating airplanes with two pilots meet major airline training standards?

Mr. KERN. Yes, sir. The evolution of the commuter airline training programs that started a year and a half ago or so is moving that entire community to a training program that looks an awful lot like the air carrier training programs—the part 121 training programs. So, the intent of the FAA, as recommended by several task forces and several safety committees, is to move that training program to be almost identical to the major air carrier training programs.

Senator FORD. Well, you mentioned the idea, I think, of training centers which would be authorized and governed by an appropriate regulation.

Mr. KERN. Yes, sir.

Senator FORD. Elaborate on that idea for me a little bit, please, sir.

Mr. KERN. We have a proposed rule right now that talks about the idea of allowing other than certificated air carriers to provide this high quality of training that we think is necessary in the aviation industry. And I will give you some good examples.

As an example, if you visit the University of North Dakota, Embry-Riddle, or any of the colleges and universities that are involved in quality aviation training programs today——

Senator FORD. It did not take you long to name all of them, did it?

Mr. KERN. I think there are about 120 in the university aviation association. And they are literally scattered about the United

States. But there are a number of them that have invested in facilities, buildings and equipment, that represent the latest state-of-the-art in training technology from desktop computers to advanced phase II simulators. And that is the kind of equipment that you would see with a major air carrier today.

If you visited some of Flight Safety International's aviation training centers or the SimuFlite Training Center at Dallas-Fort Worth, you would see state-of-the-art training centers that, I believe, can provide, again, the quality civil training that we need in the aviation marketplace today.

Historically, our rules have been directed toward allowing airlines only to provide their training, basically. What we are doing is saying, if you are an airline, either a large carrier or a small air carrier, it might make sense—and probably does in some cases from a safety standpoint—to take advantage of some of these other facilities that are already there and can provide quality training for your pilots, rather than have an air carrier procure its own equipment.

Our new, advanced crew qualification rule will allow air carriers, both part 121 and the regional air carriers—and I believe it is the regionals that ultimately will really benefit from this, because they are generally smaller and generally do not have the resources to invest in a $13 million simulator or building that may cost in excess of that. It makes a lot of sense to me to have training centers that can contract with the smaller commuter air carriers, and the large, to provide this quality training.

The rule we are developing will allow this. It will provide the proper safeguards for the approval of the curriculum, the oversight that the FAA has typically provided over all training, whether it is in an airline or outside of an air carrier.

So, I think it is a progressive rule. It will provide for new efficiencies, I believe, in the air carrier and commuter industry. It will also allow those centers to invest in the latest state-of-the-art in training technology. And it is something that is growing out there in the industry right now. And I believe, 3, 4, or 5 years from now, it is going to be something that really is the mainstay of the training environment for the commuter and the airline training business.

Senator FORD. One quick question. What is the FAA's response to the National Transportation Safety Board's recommendation of crew pairing?

Mr. KERN. After the unfortunate accident in Denver two years ago, NTSB questioned the crew pairing in that DC–9 aircraft. A relatively—and I use this term very loosely—inexperienced captain and co-pilot on an aircraft. FAA responded by developing and publishing an air carrier operations bulletin that recommends to the carriers that crews be paired as follows: If a co-pilot has fewer than 100 hours in that type airplane, then the captain must have more than 100 hours in that type of airplane. If the captain has fewer than 100 hours in that type airplane, then the co-pilot must have more than 100 hours in that type airplane.

It also mandates things like requiring the captain to make the takeoffs and landings. It talks about raising weather minima under

certain circumstances. And that bulletin has been adopted virtually by all the air carriers in the United States.

Senator FORD. It would not make sense to me that the less experienced pilot would be captain.

Mr. KERN. Manipulating the controls.

Senator FORD. I know, but you said a co-pilot would have to have over 100 hours if the pilot did not have. And maybe that would be the captain, I guess.

Do you have any figures on whether a pilot is better with a college degree than, say, something less?

Mr. KERN. I do not have any, but I can tell you that this is a subject that is unsettled, in my view, within the academic community. I have talked to colleges and universities. Some are absolutely adamant that a 4-year college degree is necessary. And I can tell you there are some educators on the other side of that issue who would disagree and say that a 2-year vocational-type training program is really the way to go.

Senator FORD. The more the education, the better the pilot, though, I would imagine.

Mr. KERN. We in the FAA have taken a different approach to that issue and said we are determining through our job task analyses what the skills and knowledge and abilities and the other attributes of a good pilot should be. And using that list of factors, we will not only help the colleges and universities to develop their curriculum, but we will also use that to revise our rules and regulations to make sure that those mandatory factors are included in the rules.

Senator FORD. Ms. Keesling, you say correctly that the Air Force can never win a salary war with the commercial airlines. And I think Senator McCain and the committee are right on target. We did some of those things last evening in the Department of Defense legislation and required additional time to be given to the country for, I guess, academy training. The military cannot provide enough trained pilots to satisfy the civil sector's demand.

I listened to your testimony, and you said you were losing 1,000 pilots more a year than you were training. So in 1994, I believe you said you would be 2,800 pilots short?

Ms. KEESLING. That is correct, Senator.

Senator FORD. Well, that is 5,000 you will lose, and then you are only 2,800 short. You would not want me to put the pencil to that and say you had a surplus today, would you?

Ms. KEESLING. No, in fact, in 1989, we anticipate by the end of the year we will have a shortage of 539 pilots for this year.

Senator FORD. Do you have any solution, or is your institution putting forth anything other than perks and things of that nature to try to keep the pilots in? I listened to your testimony. You are moving them from a desk to the cockpit and things that they would like to do. I think a pilot hates to sit behind a desk.

Ms. KEESLING. That is correct. And that is why we are moving at least 1,200 of those positions to the nonrated force, which have traditionally been in the rated force. So those people will be nonpilots who will be doing those kinds of things.

We have also tried to take away some of the additional duties that have been irritants. We have tried to make the tours more

stable. We have increased the active service commitment, as you talked about the Academy. Currently, for our pilots, we require 8 years. That was done last year. The year before that we changed it to 7. So we have continued to up that.

Senator FORD. Is that by law or by your regulations?

Ms. KEESLING. That is by policy for the Air Force.

Senator FORD. By policy. All right.

Ms. KEESLING. The other services are not as long as we are. But we have gone to the 8 years. And we have not noticed a change as far as our ability to recruit pilots, to date.

We have also looked at things like helping to support the families of our members by having family support centers and other kinds of things that have cost some money, but we felt that it was important to do.

Senator FORD. Without being a direct salary?

Ms. KEESLING. That is correct.

Senator FORD. Do you have any suggestion that any part of the Air Force pilot training that should be included in training pilots for the commercial airlines?

Ms. KEESLING. We know that some of the training that we do for our military pilots is not directly applicable, some of the low-level things, to the civilian sector. So there are a lot of things that we do, and I would have to provide those requirements for the record. But there are other things that we require our military pilots that I do not believe the commercial airlines use.

[The following information was subsequently received for the record:]

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Air Force and commercial pilot training requirements alrady parallel one another in most areas. However, the Air Force requires formation flight training and low-level training for all new Air Force pilots. These skills provide a basis for the advanced training necessary to meet operational mission requirements of most fighter aircraft and many heavy multi-engine aircraft such as the B–52 and C–141B. While these skills would enhance the judgment and experience level of any pilot, they would not necessarily have a direct application to commercial airline flying.

Senator FORD. Well, with an amendment that we passed the night before last, we had better train our pilots to be military pilots, because an amendment was put on a DOD bill; it was shoot first and then ask questions. So they are going to have to have some pretty good training.

Senator MCCAIN. Innovation.

Senator FORD. Yes.

Høs the Air Force developed a profile of an individual who makes the best pilot?

Ms. KEESLING. We currently do require a college degree for our officers, and since our pilots are officers, for our pilots. So we believe that a college degree, in our experience, has proved beneficial as far as getting through pilot training.

We also find that people who have had a private pilot's license also, of course, do better in our pilot training. Those are probably the two key factors for us.

Senator FORD. Thank you.

Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman. And thank both witnesses for being here.

Mr. Kern, I have had the pleasure of working with you and appreciate all your assistance on the issue concerning overflights of the Grand Canyon, which I think we were able to resolve to the satisfaction——

Senator FORD. Is that still out there?

Senator MCCAIN. We always welcome a visit from the distinguished Senator from Kentucky.

And Ms. Keesling, I note by your biography that you had the maturity and judgment to attend Arizona State University.

Ms. KEESLING. That is correct.

Senator MCCAIN. I am certainly glad to know that. It probably accounts for all of your subsequent successes I am sure.

Ms. KEESLING. Certainly.

Senator MCCAIN. Mr. Kern, I appreciate your testimony. Let me just set up the next question a little bit if you do not mind. Ms. Keesling says in her statement in fiscal year 1989, the Air Force lost over 1,000 more pilots than it produced in undergraduate pilot training. Later in her statement she says, by all estimates the Nation will need between 4,000 and 8,000 pilots per year to supply military service and expanding commercial aviation requirements, remembering that the cost estimates range between $3 million and $5 million per military pilot, depending on what his subsequent training is.

Captain Duffy, who will testify later on, quotes in a recent accident report the National Transportation Safety Board stated,

> The rapid growth of the aviation industry at a time when fewer experienced pilots are in the work force has reduced the opportunity for a pilot to accumulate experience before progressing to a position of greater responsibility. This loss of seasoning has led to the assignment of pilots who may not be operationally mature to positions previously occupied by highly experienced pilots.

Now, in response to the chairman's question, I think you have stated that you are satisfied with the situation today as to the level of experience and professionalism of the pilots, including the commuter pilots, which is a subject, obviously, of great concern.

But given the statistics that we are talking about here and the trend of increasing requirements for civilian airlines, are you concerned about the future of safety in the commercial aviation industry in this Nation?

Mr. KERN. Let me answer that in two ways, and first of all say that one of the reasons that the FAA has taken this unprecedented review of literally every one of our training rules and regulations, from a private pilot up through the airline transport pilot, they are all under review right now—we started that about a year and a half ago—was to take a fresh look at the safety issues that may be out there today. And part of that concern was caused by this rapid growth in the industry and the rapid turnover.

So we are taking a look at that from one side. And we want to make sure that our rules and regulations are, in fact, appropriate for the new breed of pilot that we will be seeing coming up through this rapidly, very dynamically growing industry.

Putting all that aside, I am concerned for the future, more than I am right now, because of what we have seen happening with the major air carriers and a lot of the not-so-major air carriers. Some of them are hiring, as you know, hundreds of pilots today, last month, and the month before. We follow that closely. I have personally visited a lot of the carriers who are hiring today.

They have expanded the pilot envelope. And the way they did that was to raise the age requirements, drop the eye requirement a little bit, and some of the other criteria that they used years ago. They have expanded the envelope.

So the pilots that are my age and up through the fifties, and in their late thirties who were in jobs that they did not appreciate and would rather be flying have now come back into the market—good, quality people with years of experience, either in the military or in other civil aviation jobs. But they are good, quality people. And, as I said earlier, once they complete the training programs that we require them to go through, they are safe and competent to do their jobs.

The concern I have, and I am not an expert on the numbers, though, is, as I said earlier, primarily in the commuter area. And it probably focuses three to four to five years out in the future. The people that will be needed at that time are the people who are probably right now thinking about entering Embry-Riddle University or one of the colleges and universities that I talked about earlier. Getting into one of the educational institutions and picking aviation piloting as a vocation.

The concern I have is that we, collectively, are not doing a good enough job of encouraging people, providing them, in some way, shape, or form, with the financial ability to then carry out those dreams. And then with the link-up to a flying job that provides that career. I think there are a lot of uncertainties in that particular area.

So, my concern today is not really for today; it is for three or four or five years down. I believe the rulemaking programs that we have underway will provide an efficient and effective way to do that—a kind of a least cost, safe path to do that. We have coordinated closely with the industry, the academic community, with the unions, everybody who would have a say in the safety or an opinion about the safety of where we are going from a regulatory standpoint.

We want to provide that vehicle, but there still is a problem of getting the people in the pipeline.

Senator McCain. Indeed. So, would it be your view, then, that it is crucial that we explore avenues which will help us provide pilots for commercial and military aviation outside of the present vehicles which provide the supply of pilots we have today?

Mr. Kern. I think some of those programs have already begun in industry. And I can give you a couple of examples. We are seeing and sensing that the large air carriers are beginning to become more involved with the concerns that I am expressing.

My personal view is that they sense the same shortage 3, 4, or 5 years out, even the large ones, in addition to the commuters. They are affiliating themselves with some of these educational institutions. The educational institutions themselves are interested in de-

veloping a curriculum that provides for the continued education of pilots once they get their initial training—of the basic pilots with 250 hours and a commercial instrument rating.

They are talking about developing a curriculum that will take that person from that point in a career, where they are today almost unhireable, to the point where they will be hireable as a co-pilot in a commuter airline.

There are three or four of the major air carriers that are involved in this right now. I am personally very excited about that. I think that that is the kind of a link-up between the educational institutions and the majors coming through the commuters that we are all going to see 5, 6, 7, or 8 years from now.

Senator McCAIN. Ms. Keesling, would you agree that it would be of value—and I do not want to get you in any trouble—for DOD to explore ways that they can support alternate methods of training pilots in order to relieve increasing pressures on recruitment of military pilots?

Ms. KEESLING. I think, Senator, that the Department would be glad to participate with others, the FAA, industry, educational institutions, in whatever way we can.

Senator McCAIN. Clearly, it is in DOD's interest to see that the pressure of this pilot hemorrhage be relieved; is that an accurate statement?

Ms. KEESLING. Yes, it is.

Senator McCAIN. I appreciate all the efforts that you have been making, and the Navy as well, in trying to improve the quality of life and all the other programs that you have put in: getting pilots back in the cockpit. Those are, I think, salutary efforts, but, at the same time, I do not think they are going to address the problem, except marginally. Would you agree with that?

Ms. KEESLING. Yes, and I think our figures would show that. As I say, even with all those things, we still know we are going to be short of pilots this year and in the future. I continue to meet with pilots whenever I travel to try and find out what other kinds of things we can do to address the issue.

So, we continue to try and do what we can.

Senator McCAIN. Mr. Kern, it is important to this committee, and for us to make progress, that the FAA support these efforts that you described, that you are excited about. And I would hope we can receive your assurance that the FAA will continue to be aware of the criticality of the situation, and that we can expect your cooperation in exploring these other avenues of obtaining qualified, professional pilots for the airline industry.

Mr. KERN. Yes, sir, we would be happy to participate.

Senator McCAIN. Being a former pilot myself, Mr. Chairman, I have never maintained that intelligence be one of the qualifications to fly a plane.

But I would note that both the Navy and the Air Force went through a major debate in the 1950's, as to whether they would take pilots that did not have college degrees.

The Air Force made that decision before the Navy. Some of us are old enough to remember, and remember that some of the really very finest pilots were those that did not have a college degree. But that is not probably worth opening at this point.

Senator FORD. Well, they were probably pressed into duty during time of emergency. Like the fellow that was excited, his house was on fire, and he picked up his piano and carried it outside. Takes six to pick it up the next day. So you do lots of things when you have to.

Senator MCCAIN. Indeed. Thank you, Mr. Chairman.

Senator FORD. I thought you would like that little story. I would just say the FAA does cooperate with the military in that it does spend a portion of its funding in support of the Defense Department. So when we look at the defense budget, that does not necessarily mean the total budget, because there is better than a billion, I think, that comes out of FAA that is supporting of the military.

I want to ask a quick question. My friend, Senator Exon, from Nebraska, just arrived.

And I asked him and he was not sure, and I am not sure. When you say that you have your pilot's for 8 years, does that include training or after training.

Ms. KEESLING. No. That is after training.

Senator FORD. After training. Fine. I recognize Senator Exon now for any questions or statements that you might like to make.

Senator EXON. Mr. Chairman, thank you very much. This is a very important hearing, and I think it is so important because those of us who labor on the Armed Services Committee have this personnel problem all the time, and pilots are a critical part of that.

I would like to ask you this question first, Mr. Kern. What percentage of the commercial airline pilots, as of today, are those who had their central training in the military?

Mr. KERN. I recall a figure of well over 60 percent. Some of the subsequent witnesses may have a better number, but it is a significant percentage, particularly in the larger air carriers.

Senator EXON. The chairman advises me that it is 69——

Senator FORD. Last year it was 69 percent of the hires came from the military.

Senator EXON. Unless we make some significant changes, Mr. Kern, what would you anticipate that the percentage—let us say, for round numbers, it is 65 percent today. Unless we make some changes and address this problem, with the increasing demands for a pilot, and what really caused us to bring this hearing, to put this out in the open today. What do you estimate that would be 10 years from now, unless we make some changes, if that is the percentage of those flying commercial airlines as pilots that received their basic training, and started in the military.

Mr. KERN. Senator, I think what we are seeing today in the industry is that percentage-wise, the numbers of military pilots that are entering duty with the air carriers is declining.

But that does not resolve the military's problems in terms of numbers because it is still significant in terms of the numbers of people coming out. There is just such a rapid growth, that even though the number is significant to the DOD, it is declining in terms of the civilian population in the air carriers.

So I would expect that the burden of pilot training will be shifting and it is shifting to the colleges and universities, and other institutions that provide civilian pilot training.

Senator EXON. Myself and others have been working for some time to try and get new schools that are very interested in this educational program going.

Are you saying then that we are going to have to do more to subsidize that type of education, possibly, significantly more than we have in the past?

Mr. KERN. Well, I would not use the term subsidize. That may be, ultimately, what happens. But in my view, the colleges and universities are going to have to pick up the burden of training civilian pilots. And in large part, they are beginning that right now. A number of them have very significant, very sophisticated pilot, and controller, and mechanic-training programs today.

Senator EXON. When I am talking about subsidies, of course, I am talking about the fact that if the Federal Government feels that, twofold, that we have an obligation to do more training in the major field of aviation, which is an important part of our transportation system, and if we feel that it would be a good investment, because, certainly, history indicates that we have been "acquiring"—I did not use the term "robbing," but have been acquiring people from the military to take the higher paying jobs in the civilian service, that it might be a good idea for us to consider that investments to some extent by the Federal Government, into more education would help along the private sector to help fulfill this need that will exist in the future. Is that a good idea?

Mr. KERN. I think that anything that we can do to help assist the heavy burden, and it is a heavy burden for people coming up through this vocation, in their undergraduate 4 years, and then beyond that, if they want to fly for a major air carrier, anything that we can collectively do to subsidize that, or to ease that burden, certainly will encourage more people to get into that field.

Senator EXON. Ms. Kessling, I would like to ask you this question. Evidently, for lots of reasons and probably the costs are one of them, we have seen a rather sharp decline in young people wishing to go into this field. And I think the desire is there. I think that the end rewards are there. The costs have been very high and that is why I think far too often we use the military as the "free training ground" for pilots, which I am not against, but it causes heartburn when we are trying to keep a strong military going that we need.

How are we coming with women pilots? Are women going into this field that for many years seemed to be the exclusive area of the males in larger numbers, and is not that a means that we should probably take a look at and encourage, as we face a shortage in the future?

Ms. KEESLING. Yes. Senator Exon. We have increased in the last year the number of women going into pilot training. It has been about 40 a year.

Our first class, of course, was in 1976. And they are just beginning to get in command positions now—some of those women.

But the women have been doing very well. As you know, we had women who were involved in the Libyan raid who were on tankers.

So we have looked at the number of women going into pilot training. Of course, we still have the problem, women cannot go into our fighters and bombers, and so that limits the overall

number that we can have. But we have increased that number in the last year.

Senator EXON. Mr. Kern, now let me ask you, in the private sector, from what you know, are we getting more women going into the field through whatever means is possible today through the colleges, through the training programs that the airlines have? Are there more women coming in in substantial numbers?

Mr. KERN. I do not think it is in substantial numbers, but I do spend a lot of time out in the training departments of the various carriers and with colleges and universities, and there are a significant number of young women, in my view, coming into the program.

We in the FAA, also, by the way, have an active program to recruit women and minorities into our own inspector ranks. And we have, if I could give a little commercial for the FAA, we have great difficulty, quite frankly, keeping them with the Federal Government, as soon as they become qualified. I think we are kind of in the same boat that the DOD is.

We have some 1,500 operations inspectors who are very well-qualified pilots, and a number of women and members of minorities. And we have had a very difficult time keeping them with the FAA over the past few years.

In a way, we, in fact, have called ourselves part of the training command, also.

Senator EXON. Thank you. Thank you for your testimony. Thank you, Mr. Chairman.

Senator FORD. Thank you, Senator.

I might just make one point. We have a community college in Kentucky—Somerset Community College that trains mechanics. Now, we are not training pilots, but training mechanics. They have an opportunity to learn this trade, or industry skill, and also get a 2-year college certificate. And they have had 100 percent employment. Quite significant.

I thank both of you. There may be questions from the three of us or others. And if we send you some questions, we hope you will respond in a timely manner.

I thank both of you very much.

Mr. KERN. Thank you.

Ms. KEESLING. Thank you.

Senator FORD. The next panel of witnesses will be a fellow that almost brings his duffel bag and sleeps up here—Capt. Henry Duffy, president of the Air Line Pilots Association, Capt. George Hof, vice-president for flight, American Airlines, and Mr. John Fredericksen, executive vice-president of Regional Airlines Association.

Welcome, gentlemen, and we are delighted to have you here this morning.

Captain Duffy, not only—I went to bed watching you last night on TV.

STATEMENT OF HENRY DUFFY, PRESIDENT, AIR LINE PILOTS ASSOCIATION INTERNATIONAL

Mr. DUFFY. Did I put you to sleep, Mr. Chairman?

Senator FORD. Well, almost.

Senator MCCAIN. Mr. Chairman, if I could say, I also watched Mr. Duffy last night, and I think he makes an excellent point.

Senator FORD. Absolutely.

Senator MCCAIN. I think he made a very important point, and I, frankly, believe that if you think that legislation is called for in what you were describing last night, I, for one would be willing to seriously consider such legislation.

I do not think you could get the kind of information that is critical in examination of these crashes if we are seeing happen, has happened.

Senator FORD. I also agree with that. The chatter sometimes is not conducive to the public's safety attitude, and some of the statements that were made that, of course, now they have been made public and we will all have to see what we can do to straighten it out.

And I agree with Senator McCain, only information that should be released is relevant information to the incident, and if it needs legislative action, I will join with Senator McCain, Captain Duffy, and see if we cannot straighten it out.

Mr. DUFFY. Thank you, Mr. Chairman.

Senator EXON. I would just like to say, Mr. Chairman, that I probably am the odd man out. I did not go to sleep watching Captain Duffy last night.

Senator FORD. You were asleep a long time before that.

Senator EXON. And I slept very well.

Mr. DUFFY. Thank you for all your comments. We were very pleased with the response, immediate response from the FAA, and from members of the National Transportation Safety Board that shared those opinions and put us very much at ease that we will be able to put a fix on this abuse.

Senator FORD. Do you want to proceed with your testimony, Captain Duffy, it would be fine.

Mr. DUFFY. Thank you, Mr. Chairman, for the 41,000 pilots that ALPA represents at 46 carriers in this country, we appreciate the opportunity to appear before you today, to discuss the important issue of the growing demand for qualified, professional airline pilots.

The air carrier industry is in a period of unprecedented growth. The airlines are expanding hub operations, adding more routes, and ordering more aircraft to allow them to compete and grow in this environment.

Because of this growth, job opportunities are soaring in this industry. Pilots are being hired in record numbers.

ALPA welcomes this hiring boom. We are concerned, though, about a possible shortage of qualified pilots in the early 1990's—a shortage exacerbated by the number of senior pilots who will be retiring at an accelerating pace in the next five years.

ALPA is even more concerned that the competition among carriers during an impending shortage, could lower the airline pilot hiring standards that have been well established in this industry.

The average flight-time of airline new hires is 3,600 hours. The amount of jet time required by airlines, however, has gone from 2,300 hours in 1983, 1,600 hours in 1984 to 800 hours in 1985. And,

today, some major airlines require as little as 500 jet flight hours experience, and others require no jet experience.

The military services help meet the need for new pilots. Currently, almost 70 percent of the pilots hired are military-trained. Many of these pilots leave active duty to fly for the airlines, but the airlines are also hiring an increasing number of retired military pilots.

The increasing demand for commercial airline pilots has hit the regional airlines hard. Between 30 and 50 percent of the pilots flying for the regional airlines move on to major carriers, which reflects an attrition rate of about 2,000 pilots a year.

The regional airlines, as well the military, continue to supply a large share of the major airline pilot work force. But they cannot meet the present or future demand.

How will the projected demand for airline pilots be met in the future?

Thousands of general aviation pilots will come into the industry at the regional, commuter and air-taxi level, filling the openings at the smaller carriers, openings that are created when their pilots jump to the large, better paying and more secure, major carriers.

To meet this demand, the airlines themselves may have to establish their own training academies to give pilots their initial ground and flight training, then integrate them into their own pilot seniority list.

As the demand for airline pilots continues to grow, and as the pool of qualified resources continues to shrink, pilot flight experience assumes greater importance.

A number of recent accidents have demonstrated the importance of pilot experience levels. Two accidents occurred within the past 18 months, which required an extreme level of airmanship on the part of highly experienced crew members to safely land their aircraft.

The most recent aviation accident just a few weeks ago, the complete failure of a critical aircraft system, required the crew members to exercise, as you have already referenced, extremely good judgment, and demonstrate exceptional airmanship in a manner never envisioned by the aircraft manufacturer or the FAA.

Procedures had never been developed to cope with the failure because such a failure was never supposed to occur. And, by the way, that Piedmont crew yesterday, the captain had 20 years, and the first officer had 3 year's experience.

Senator McCain has already referenced the NTSB quote on the need and their fears for the lack of experience, particularly in regional carriers.

The NTSB recommended the FAA establish minimum experience levels for air carrier pilots in their respective positions, and require the use of such criteria to prohibit crew members with such low experience, from flying together.

In response to this recommendation, the FAA issued an air carrier operations bulletin with guidance that air carriers not pair together crewmembers with less than 100 hour's experience, and their crew position in the aircraft type.

ALPA feels that a greater number of hours and experience in various, appropriate types of aircraft, should be specified by the

FAA until better initial pilot training standards and proficiency criteria are developed and implemented for pilots who desire to fly in air carrier operations.

Two basic schools of thought exist on the subject of pilot training. One is, that the market will create conditions mandating that enough pilots be trained.

The other is that commercial aviation should be established as an accredited discipline to the appropriate colleges and universities in this country.

The solution to the problem of assuring an adequate supply of professional airline pilots lies in the two-pronged approach of an appropriate education and intensive, concentrated pilot training.

An appropriate education would preferably include a 4-year college degree, rigorously structured in the aerospace-related discipline, which would prepare the student for a career as a professional pilot.

After graduation, the student would begin pilot training, which must include a thorough ground school indoctrination, and demonstrated flight proficiency in the many phases of piloting skills which encompass the airline piloting profession.

My submitted statement provides more specific details on the problems I have just identified and the solutions that we have proposed.

ALPA will be very pleased to work with the subcommittee to address this very important problem.

Thank you.

[The statement follows:]

STATEMENT OF

CAPTAIN HENRY DUFFY

PRESIDENT

AIR LINE PILOTS ASSOCIATION

Mr. Chairman and members of the subcommittee, I am Henry Duffy, President of the Air Line Pilots Association (ALPA). ALPA represents 41,000 professional pilots who fly for 46 commercial airlines. ALPA appreciates the opportunity to appear before you today to discuss the important issue of the growing demand for qualified professional airline pilots.

The airline industry continues the unprecedented growth it has been experiencing. This growth is being achieved through route and service expansion coupled with record aircraft acquisitions. Aircraft manufacturers have their assembly lines sold out for

years and continue to introduce new aircraft and revised models of existing aircraft.

Airline passenger traffic is up, in part, because of the healthy economy, and the low cost and convenience of air travel. Overall, job possibilities are soaring in the airline industry. Because of the long training times and high skill levels required, there is a surge in the demand for qualified airline pilots. So far in 1989, major, national, and regional air carriers have hired over 12,000 pilots! In 1988, these same carriers hired only 9,800 pilots during the entire year. In 1987, over 11,000 pilots were hired.

The FAA's projections for aviation industry growth -- found in the FAA Aviation Forecast for Fiscal Years 1988 through 1999 -- indicates a growth rate of 2.6 percent per year from now until 1999. According to the same projections, by 1999 the U.S. air carrier fleet will number 4,651 aircraft and will carry 75 percent more passengers than were carried in 1987. These figures may be updated by the FAA at its 1989 Forecast Conference, but using the FAA projections that were available, more than 32,000 new airline turbojet pilots will be needed over the next decade to fly the growing U.S. airline fleet. Commuter airlines will experience even more growth than the major airlines, both in

aircraft and passengers. Commuter airlines not flying jet aircraft are expected to hire an additional 20,000 to 30,000 pilots over that same 10 year period. These projections add even more weight to the prediction that there will be a pilot shortage in the early 1990s.

This high demand shows no sign of abating anytime soon, according to the Future Aviation Professionals of America (FAPA), an independent aviation career information clearing house that compiled the hiring figures just mentioned. FAPA predicts that between 17,000 and 19,500 pilots will get jobs this year. This includes new cockpit crewmembers coming into the pilot workforce for the first time and pilots who leave turboprop jobs for new jobs with jet airlines. Pilot hiring at major, national, and regional airlines is conservatively expected to add between 4,600 and 5,600 new pilots to the workforce per year for the next five years. The demand for professional pilots does not appear to be slackening.

Today, almost 70 percent of the pilots hired by the airlines are military trained. This compares to the period from 1984 to 1986 when less than 50 percent of the hired pilots had military training and experience. The airlines currently hire around

5,800 former military pilots per year. Most of these new-hires are senior Air Force Captains or just-promoted Majors or Navy Lieutenant Commanders. The number of retired military pilots being hired by the airlines is increasing dramatically.

ALPA certainly welcomes this hiring boom. We are concerned, though, about a possible shortage of qualified pilots in the early 1990s; a shortage exacerbated by the number of senior pilots who will then be retiring. ALPA is even more concerned that the competition among carriers during an impending pilot shortage could lower the airline pilot hiring standards that have been well established in the industry.

The increasing demand for commercial airline pilots has hit the regional airlines hard. Between 30 and 50 percent of the pilots flying for the regional airlines leave which reflects an attrition rate of 2,000 pilots per year. About 90 percent of the pilots who leave the smaller carriers will go to work for the major airlines. The military and the regional airlines together continue to supply a large share of the major airline pilot workforce, but they cannot meet the present or future demand.

How will the projected demand for airline pilots be met in the coming years? Thousands of general aviation pilots will come

into the industry at the regional, commuter and air taxi level, filling the openings at these smaller carriers; openings that are created when their pilots jump to the larger, better-paying, more secure major airlines. Another source for airline pilots may be the airlines themselves. In other words, airlines may have to do more of their own pilot training. American Airlines had considered the idea of establishing an in-house pilot training academy to give pilots their initial ground and flight school training then integrate them into American's system. American abandoned the idea because it felt it could continue to get the pilots it needed from general aviation, the military, and commuter airlines.

The European airlines are well ahead of the United States in establishing so called "ab initio" pilot training programs which will assure them of a supply of appropriately trained airline pilots. Lufthansa has had such a program since the mid-1950s. Following rigorous selection and hiring criteria, an individual hired by Lufthansa without previous flight experience is enrolled in an intensive ground and flight training program. After several years and almost five hundred hours of flight training, the pilot will be ready for the right seat of an aircraft like the Boeing 737. Lufthansa rigidly controls the selection, hiring, and training process to assure the highest quality

airline pilot for their operation.

British Aerospace is establishing their Flying College in response to a world-wide demand for high quality, disciplined professional pilots. In this country, several universities are considering similar programs of study which will produce highly capable graduates to meet airline needs. Some U.S. airlines are considering supporting these programs but with no real promise of employment to the students or assistance with tuition costs. However, this outlook might change if a well-structured and funded program were developed and implemented.

Pan American, and it's regional partner, Pan Am Express, have established a unique working relationship for pilot hiring. When a pilot is hired, his experience and qualifications will determine his duty assignment. Pilots with appropriate qualifications and turbojet flight experience will fly with Pan American. Others will go to Pan Am Express. During a pilot's career, as experience is gained, there will be opportunities to fly larger equipment and longer routes with Pan American.

As the demand for airline pilots continues to grow, and as the pool of qualified resources continues to shrink, pilot flight experience assumes greater importance. A number of recent

accidents have demonstrated the importance of pilot experience levels. Two accidents occurred within the past 18 months in which two different types of aircraft lost significant portions of their fuselage. These accidents required an extreme level of airmanship on the part of highly experienced crewmembers to safely land their aircraft. In the most recent aviation accident, just a few weeks ago, the complete failure of a critical aircraft system required the crewmembers to exercise judgement and demonstrate exceptional airmanship in a manner never envisioned by the aircraft manufacturer or the FAA. Procedures had never been developed to cope with the failure because it was considered such a failure would never occur. The crew was able to call upon their skill and experience to handle the emergency. The aircraft crashed at the end of the runway but many lives were spared because of outstanding pilot performance.

The National Transportation Safety Board (NTSB) feels that crewmember experience is an important consideration in air carrier operations. In a recent accident report, the NTSB stated:

> The rapid growth of the aviation industry at a time when fewer experienced pilots are in the workforce has reduced the opportunity for a pilot to accumulate experience before progressing to a position of greater responsibility. This

loss of "seasoning" has led to the assignment of pilots who may not be operationally mature to positions previously occupied by highly experienced pilots.

The NTSB recommended the FAA establish minimum experience levels for air carrier pilots in their respective positions and require the use of such criteria to prohibit crewmembers with such low experience from flying together.

ALPA feels that a greater number of hours and experience in various appropriate types of aircraft should be specified by the FAA until better initial pilot training standards and proficiency criteria are developed and implemented for pilots who desire to fly in air carrier operations. It is extremely important that pilots receive adequate initial ground and flight training appropriate for an airline career, such as that training provided by Lufthansa airlines when they hire a person with little or no pilot flight time. Such "ab initio" training can firmly ground a pilot in the important aspects of becoming a professional airline pilot.

On the subject of pilot training, two basic schools of thought exist. One is that the market will create conditions mandating that enough pilots be trained. In other words, major carriers may be forced to develop in-house, ground-up training facilities

just to keep pace with the need for pilots, as well as to keep abreast of the competition.

The second school of thought, and one vigorously supported by ALPA, involves enhancing the efforts of 400 colleges and universities that now offer courses in aeronautical study by establishing commercial aviation as an accredited discipline. This concept has been endorsed by the University Aviation Association (UAA), which is made up of deans of aviation at many universities, including Parks College, Auburn University, Middle Tennessee State College, University of North Dakota, Southern Illinois University, The Ohio State University, and Embry-Riddle Aeronautical University.

On October 18, 1988, the UAA Board of Trustees voted to establish the Council on Aviation Accreditation (CAA). This council was initially developed by the UAA and ALPA, and ALPA actively participates in it's activities as an industry member. The CAA has three main goals:

1. To encourage collegiate aviation academic program uniformity and excellence by establishing minimum educational quality standards.
2. Stimulate collegiate aviation program excellence and self-improvement.

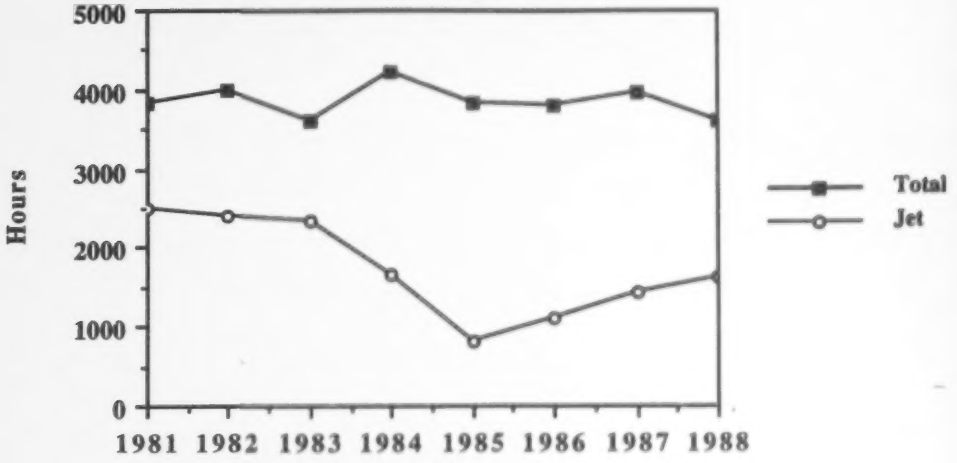
3. Increase the credibility, integrity, and acceptance of collegiate aviation programs within institutions and the higher education community.

ALPA is going to be pursuing these and other programs in the coming years. Through such efforts, ALPA intends to ensure that during times when demand for pilots is high and supply is low, the highest standards of education and professionalism are maintained for commercial airmen.

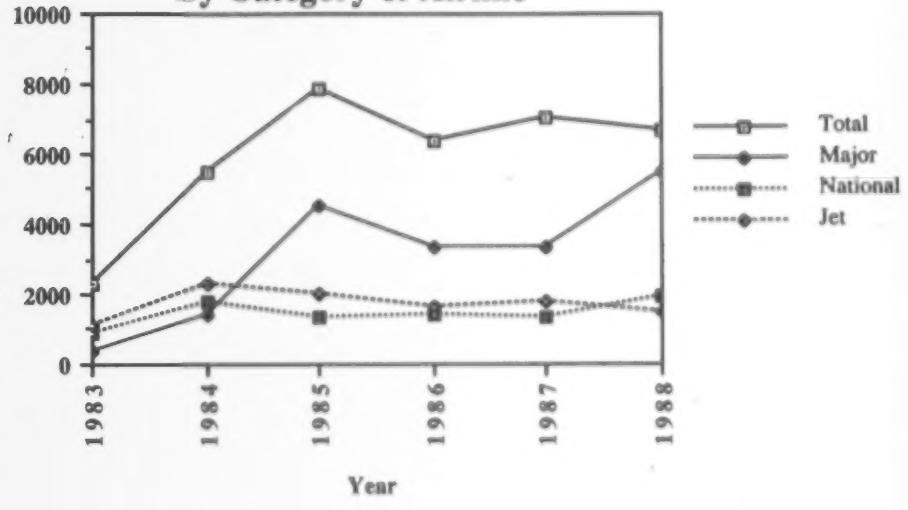
The solution to the problem of assuring an adequate supply of professional airline pilots lies in the two-pronged approach of an appropriate education and intensive, concentrated pilot training. An appropriate education would preferably include a four-year college degree in an aerospace-related discipline. Pilot training must include opportunities for thorough ground school indoctrination and demonstrated flight proficiency in the many phases of piloting skills which encompass the airline piloting profession.

Thank you very much for the opportunity to share our Association's views regarding the assurance of an uninterrupted supply of highly skilled professional airline pilots.

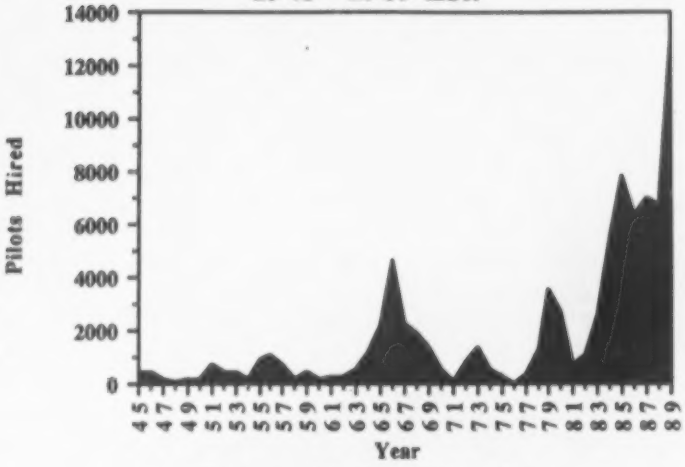
Average Flight Experience In Hours
Major Airline New Hire Pilots 81-88



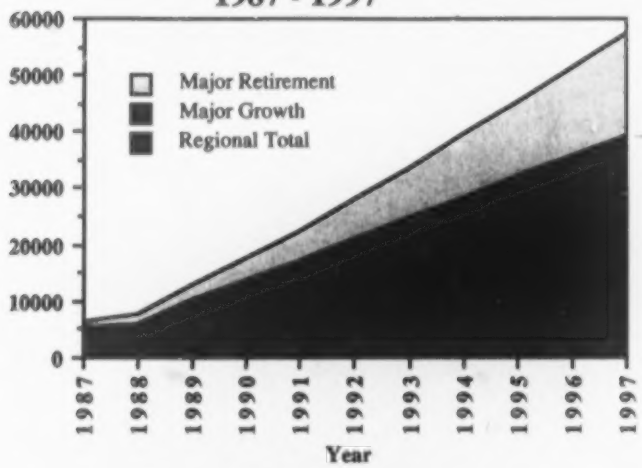
New Hire Pilots
By Category of Airline



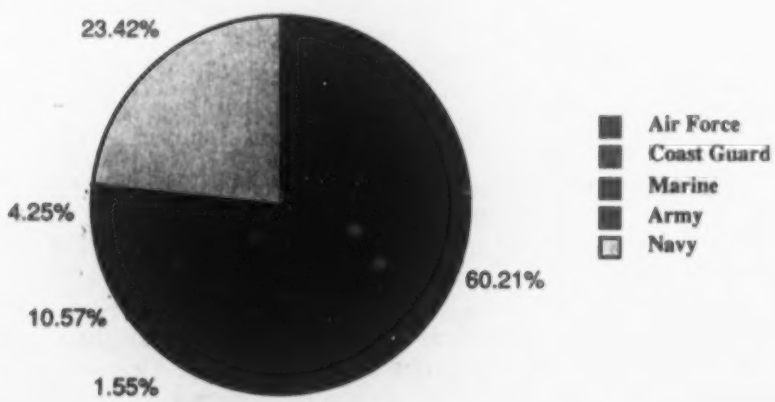
Jet Pilot Hiring By Year
1945 - 1989 Est.



Future Airline Pilot Jobs
1987 - 1997



Branch of Military
1988 Major Airline New Hire Pilots



Senator FORD. Thank you very much, Captain.

Captain Hof, if you will borrow the microphone from Captain Duffy there and proceed.

STATEMENT OF GEORGE HOF, VICE PRESIDENT FOR FLIGHT, AMERICAN AIRLINES

Mr. HOF. Yes, sir. Thank you.

Thank you very much, Mr. Chairman. I am George Hof, vice-president of flight for American Airlines, and my responsibilities with the company encompass the setting of policies and flying procedures for American's flight operation, management, and administration of our flight crew, or work force, the hiring and training of flight personnel, and the maintenance of the qualifications and competence of our flight crews.

American has a centralized flight training facility located adjacent to the Dallas/Fort Worth International Airport, which houses 20 full-flight simulators of various aircraft types, which we believe is the largest single simulator fleet in the free world.

We have classrooms to support initial, transition, upgrade, recurrent and international training requirements. And we have state-of-the-art computer-based-training systems complimented by a highly qualified ground school and flight instructor staff.

Line-qualified pilots and flight engineer-check airmen are utilized to provide required final training and checking of all crewmembers.

Our facility is handling just under 100,000 student days per year. And simulator utilization is planned at 16 hours per day on an annual basis.

Pilot promotion is based on seniority. A new-hire pilot today with American can expect to serve as a flight engineer and co-pilot for a minimum of 8 to 10 years, before promotion to captain, depending on his choice of crew domiciles, and based on our present airline planning.

Our current captains have served at least 11 to 14 years as flight engineer and co-pilot before promotion.

Since the start of our growth plan in 1983, American has hired 3,400 new flight crewmembers. Current planning will see us continuing the new-hire program at the rate of about 600 per year to accommodate new aircraft acquisitions and pilot attrition.

Through year-end 1988, 66 percent of our new hires has come from military or Navy programs. The remaining have civilian sector flying background, with charter, corporate or regional airline experience.

Overall, the average experience level of our new hire includes about 3,600 hours of pilot flight time. And 75 percent of those hired by American hold the FAA airline transport pilot rating; 80 percent have college degrees, and the average age in this group is 32 years.

Following initial indoctrination, and regardless of background and experience, all new hires undergo a full flight-engineered transition training course in the equipment to be flown, and an FAA or a company-equivalent check ride to insure competence.

They then enter line service, initially under the supervision of the check airmen, and enter a 1-year probationary period, supervised by line flight managers and our line captains.

Promotion to co-pilot and then to captain at the appropriate seniority level is a requirement for continuing employment.

All of our flight crew members receive thorough training in crew resource management, airline security and hazardous material handling, in addition to the rules, regulations, and procedures which govern our flight operations.

Special ground school simulator and flight training programs are developed and conducted as required by our changing and expanding operations.

We work closely with the FAA to obtain their review and approval of all of our training programs.

We also enjoy a fine rapport, and work closely with the safety, training and technical committees of the Allied Pilots Association and the Flight Engineers International Association for bargaining units for our pilots and professional flight engineers.

Finally, a recent development is the acquisition of four, well-managed regional carriers by an American Airline subsidiary, AMR Eagle. These carriers, plus two franchise regionals, provide passenger feed to American hub airports from nearby communities with less dense air travel requirements.

Members of my staff and personnel from our maintenance and system operation control organizations audit the franchise Eagle operations in my annual schedule. And we are forging a closer relationship with the owned Eagles, in order to make American's experience and technological capabilities in the training area, available to those carriers.

Over the next 2 to 3 years, American will add five, new full-flight simulators to our fleet to meet growth requirements, and will begin equipping the American Eagle entities with American-managed simulators and training, as their fleets are modernized and their training is centralized.

Thank you very much. We appreciate the opportunity to participate in this hearing.

[The statement follows:]

STATEMENT OF CAPT. GEORGE H. HOF, JR., VICE PRESIDENT FOR FLIGHT, AMERICAN AIRLINES

Good morning, Mr. Chairman and Members of the committee. It is a pleasure to be here this morning to describe American Airlines' pilot hiring and training programs. My name is George A. Hof, Jr., vice president flight, American Airlines. I joined the U.S. Air Force's aviation cadet training program in 1949 and served with the military air transport service during the Korean war. I joined American as a pilot in 1957 and have held a number of positions since that time.

American Airlines has an exceptional group of men and women flying our aircraft. Each one has been thoroughly trained in our sophisticated state-of-the-art training programs. The end result is that we have the most talented flight crews in the system. Since adoption of its growth strategy in late 1983, American Airlines has nearly doubled its total work force, has doubled its aircraft fleet size and has hired and trained some 3,400 new flight crewmembers. Through careful selection, thorough training and close supervision during new flight crewmembers in a safe, orderly and efficient manner.

Additional aircraft have also provided promotional opportunities for incumbent personnel at a rate previously not experienced by the airline. Through use of modern total flight simulation, computer based ground school training and long-

standing train-to-proficiency and up-or-out policies, we have maintained a high level of competence among our flight crew professionals. All crewmembers are carefully and thoroughly schooled in the principles of crew resource management, crew coordination during normal and abnormal operations, use of standardized checklist procedures and application of the monitored approach concept in our flight operations.

American's reputation for quality, stability, sound management and growth have made us an employer of choice, especially among those seeking a rewarding career as a flight crewmember. Notwithstanding high standards for pilot applicants and a very demanding selection process, American continues to attract and hire very well qualified flight crew personnel. These individuals exceed the minimum standards established by the FAA. We continue to receive large numbers of job applications from individuals wishing to join American.

Finally, we enjoy an excellent working relationship with the American Eagle Commuter Network. Planning calls for increasing direction and participation in the selection and training of pilot personnel for our Eagle operations.

We are appreciative of the opportunity to discuss these areas of interest with you. I would be delighted to respond to your questions.

Senator FORD. Thank you very much, Captain.

Mr. Fredericksen.

STATEMENT OF JOHN FREDERICKSEN, EXECUTIVE VICE PRESIDENT, REGIONAL AIRLINE ASSOCIATION

Mr. FREDERICKSEN. Thank you, Mr. Chairman. I am John Fredericksen.

If I might, sir, just briefly summarize my written testimony, we are the commuter airlines that you have been talking about this morning. There are 163 companies like that in the country. We employ approximately 6,500 pilots.

I am not going to sit here and tell you that the problem of pilot turnover is not a problem for us, because it is. I have surveyed our carriers and found that the turnover of pilots really varies widely around the country. We have had small carriers who I have talked to who have turned over their entire pilot force in a given year.

Some of the larger carriers who have been around for a while, or who are in parts of the country where for one reason or another major airlines do not seem to be hiring, have pilot turnover rates down in the 10 percent range. Generally, though, averaging it out, I would agree with Captain Duffy that the numbers are between 30 and 50 percent.

I would say right in the middle—40 percent—right now of the regional airline pilots are turned over every year. The vast majority of those pilots leave the commuter carriers to go to the major airlines.

In a sense, we have the same problems that the military does. The only difference is that we cannot legislate that our pilots stay longer. We would like to be able to do that.

We can never pay a guy as much to fly a 19-seat airplane as you can pay a guy to fly a 200-seat airplane. The economics of our business will never allow that, so we are going to continue to see a turnover in our business.

Retaining our pilots to any great extent is never going to be a realistic option for us. What we have to do is make sure that we can continue to train pilots who meet our standards and who can continue to fly the airplanes the way we want them flown.

In a sense that is the same problem the military has. We have to do standardized, efficient training of a lot of pilots, more pilots

than we were used to before. It is going to cost us more money. We are going to have to find more efficient ways to do that.

You hear once in a while, people asking if our standards are being reduced. That is not true, Mr. Chairman. It is true that occasionally some of the companies are hiring pilots now with less total flight time than they probably might have before the market got so tight.

Most commuter carriers—I am generalizing—require a guy to have 1,500 hours before they will hire him as a pilot. You are seeing some of the carriers now, if a pilot has particularly relevant experience to the type of airplane being flown by the commuter, hiring a pilot with less time than that.

It is going to be a reality in the business that less flight time is going to have to be accepted and we are going to have to get away from this view that flight time on its own is a measure of pilot proficiency.

The military, as you know, trains a pilot in 200 or 300 hours to fly the most sophisticated airplanes in the world on tremendously demanding missions. We, to a certain degree, are going to have to do that same thing and we are doing that now, primarily, I think, through the advent of simulation.

That kind of simulation training, where you can sit down at a simulator, do in a short amount of time what it takes a long time to do in the airplane—do a lot of emergencies, train as a crew and train people around the clock—that kind of training now is becoming available to the regional carriers through a lot of avenues.

The training is available through the manufacturers who want to sell them airplanes and who provide those simulators, through the independent simulator companies, through the advanced training device program that Mr. Kern talked about and which we are constantly encouraging.

Those are the kinds of efficiencies we are going to have to put forward. We do believe, though, that we are seeing now the beginning of that program to churn out those pilots, to create qualified—airline qualified pilots. The university programs are coming along. The major airlines are coming along.

TWA has a program in St. Louis for training Metro pilots—commuter airline pilots. TWA does not fly Metros, but they have a separate training department to train Metro pilots now, and many carriers are hooked up with them because the Metro is such a popular airplane.

Those are the kinds of things we are going to see more and more and more of. We think that being an airplane pilot is still a very attractive job. It is going to attract a lot of people.

We may need some help from the government, maybe in the nature of student loans, something where a guy can afford to get the flight training he needs to qualify to sit in the right seat of a regional airliner, but I think we are moving in the right direction.

Thank you, sir.

[The statement follows:]

STATEMENT OF JOHN S. FREDERICKSEN, EXECUTIVE VICE PRESIDENT, REGIONAL AIRLINE ASSOCIATION

I am John S. Fredericksen, Executive Vice President of the Regional Airline Association (RAA). On behalf of our 76 member airlines, I appreciate the opportunity to join this panel today to discuss pilot supply and demand.

Last year, the 163 companies in the U.S. commuter airline business carried over 35 million passengers. RAA members are all scheduled airlines, operating aircraft ranging from eight passenger Cessna 402s to 100 seat BAe-146 jets.

Because RAA member airlines operate such a wide range of different sized aircraft, they operate under two different FAA regulatory schemes. Those carriers utilizing aircraft larger than 30 seats operate under Part 121 of the Federal Aviation Regulations. Those operating aircraft with 30 or fewer seats operate under Part 135. Many commuter carriers fly aircraft under both Part 121 and Part 135. Currently, regional airlines operate about 360 airplanes under Part 121, and about 1450 aircraft under Part 135. About 42% of the available seats on U.S. regionals are on Part 121 aircraft.

The safety record of the commuter airline industry under deregulation has been remarkably good. The general trend has been for the accident rates to improve nearly every year, even as the number of passengers carried has almost tripled under deregulation. Last year, 1988, was the safest year for the Part 135 segment of the industry since the NTSB started keeping

records. The Part 121 commuters completed their fifth straight year without a fatal accident. This year so far has seen a continuation of that excellent performance.

COMMUTER AIRLINE PILOT QUALIFICATION AND TRAINING

Those regional airline pilots flying Part 121 aircraft operate under exactly the same training and qualification requirements as do major airline pilots. Since 1978, the Part 135 operating rules for scheduled airline pilots have been substantially similar to those of Part 121. Under Part 135, commuter pilots-in-command on multi-engine passenger flights must hold a valid Air Transport Pilot certificate and must have satisfactorily completed instrument and flight proficiency checks each 6 months. Before any pilot may act as a pilot-in-command on a commuter flight, he must have not only completed all applicable ground and flight training, he must have also passed a checkride in which he has demonstrated a level of proficiency and knowledge in his particular airplane comparable to that required at issuance of his Air Transport Pilot Certificate. In addition, before being released to fly the line, a commuter pilot-in-command must also have had operating experience on his carrier's actual route system with a check airman monitoring his performance.

Last year, RAA was an active participant in a joint FAA/industry task force on flight crew performance. The task force made a number of recommendations to FAA on how to improve training and checking methods for pilots. One of the most significant

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recommendations, and one heartily endorsed by RAA, was that all scheduled air carriers using aircraft requiring two pilots have their pilot training and checking done under the rules of Part 121. Since many commuters now are forced to operate two separate training programs, if they operate Part 121 and Part 135 aircraft, the rule change would produce real economies in recordkeeping and training program development. More importantly, airline pilots would operate under a single regulatory scheme throughout their professional careers, making transition to different aircraft smoother and possibly safer. Finally, a transition to all Part 121 training would remove the prevalent, yet inaccurate, perception held by non-aviation professionals that commuter airline pilot training under Part 135 is not as stringent as that required of Part 121 pilots.

PILOT TURNOVER IN THE COMMUTER AIRLINE INDUSTRY

The large scale hiring of commuter airline pilots by the major airlines is not a new phenomenon. In November 1985, my predecessor at RAA testified before this subcommittee that the record level of recruiting by the major airlines was becoming a cause for concern among the commuters. We stated that, at that time, the commuter segment of the airline industry employed about 5,500 full-time pilots, and that in some cases, carriers were facing annual pilot attrition rates of upwards of 30%.

Today, the commuter airlines employ approximately 6,500 full-time pilots. The pilot attrition, or replacement rates, vary

dramatically by carrier, and in some carriers, by any given month. Some small regional carriers have replaced the equivalent of their entire pilot workforce in a given year. Some larger regional carriers report a pilot attrition rate less than 10% per year. We estimate that, industry wide, 40% of the commuter pilot force will need to be replaced every year. Since the vast majority of regional airline pilots leave to accept positions with major airlines, that number will likely increase if the projected increased hiring by the major airlines materializes.

Like the military, the regional airlines are taking every available step to reduce the attrition of their pilots. Some of them who are owned by major airline holding companies have offered seniority numbers to their pilots, providing for an orderly progression into the larger equipment flown by the majors. Pan Am Express, for example, has a guaranteed number of pilots who are moved into the Pan Am operation every month, providing an incentive for a pilot to stay with the company. All commuters enthusiastically seek out qualified pilots who have no interest in a major airline career, either because of their age or because most regional pilots are home every night, or for other reasons.

The continuing rapid turnover of pilots has created a need for much more efficient training departments at the regional airlines. A few years ago, no one built advanced simulators for regional aircraft. Most carriers did their training in

the airplanes. Now, many regional airline manufacturers provide simulator training for the aircraft they produce, and independent simulator companies such as Flight Safety International have invested heavily in providing new capability for the regional carriers. The intense, crew oriented training in simulators, combined with their around-the-clock availability, provides the best long-range solution to ensuring the consistent quality of regional airline cockpit crews. Advanced motion-based simulation remains very expensive, however, so that RAA has helped develop the concept of a non-motion, high fidelity simulator known as an Advanced Training Device. These machines, which could be purchased for one-quarter the cost of a full-motion simulator, could be used for very efficient on-site training of commuter pilots, and would greatly reduce the amount of training required in the actual airplane. Advanced Training Devices are not now in use in the industry, but we remain convinced of their eventual utility.

Most pilots entering the commuter airline pool come from the traditional pools of general aviation flight instructors and Part 135 on-demand charter pilots. The university training programs are not yet producing large numbers of pilots who are airline qualified. Every member airline reports a backlog of applicants for pilot positions. The hiring process for some carriers has, however, become more cumbersome, since some pilots are hired away by other carriers even before their class starts. Some carriers

are reporting that they are interviewing more pilots for every one that they hire. Most companies interview between 4-10 applicants before hiring a pilot.

In some cases, carriers are hiring pilots with relatively low total flying time, if they have successfully completed a rigorous training course in the specific airline they will be flying. Comair in Cincinnati, for example, has begun hiring graduates of the TWA training school for the Metro III aircraft. These pilots, most of whom have less than the 1500 total hours normally required for a new hire pilot, are all intensely trained in airline-type flying using Metro simulators and aircraft. They then complete the Comair training process, and are assigned to line flying with a senior captain for the first 30-60 days. ASA, in Atlanta, has a similar arrangement with Flight Safety International's pilot school. Several of the university based training schools are also beginning to produce pilots who will be ready to step directly into regional airline co-pilot seats. Like the military, civilian aviation can produce very capable co-pilots in 300-400 flight hours. The old notions that flight hours equals proficiency will have to be carefully re-examined.

MARKET FORCES WILL PRODUCE ADEQUATE NUMBERS OF PILOTS

Most people in the regional airline industry accept the fact that rapid pilot attrition rates will be a fact of life as long as the growth in the airline business continues and as long as the age 60 retirement rule remains in effect. It is the air carrier's

responsibility, with the FAA overseeing us, to make sure that the quality of our pilots does not suffer. We must continue to train and check pilots in the most relevant and efficient ways possible. We believe that combinations of the airline community, the universities, and the independent simulator providers can provide these efficiencies, and will contribute an adequate, continuing supply of professionally qualified pilots. We would favor a loan program for pilots, where students might pay for flight training, and them reimburse the government after they are hired by an airline. We do not feel, however, that a formal government training program for airline pilots is necessary at this time.

Thank you for the opportunity to present our views on this matter.

Senator FORD. Thank you, Mr. Fredericksen. Captain Duffy, your testimony mentions the importance of aviation courses such as those the European carriers provide for their pilots. Who do you believe should pay for these training costs?

Mr. DUFFY. Well, again I think the problem, Mr. Chairman, is we have normally had a predominance of military pilots who have, despite the service that they come from, a fairly standardized ground school when they come to the airlines, so principles of flight and that type of thing are not necessary for the airlines to teach.

As we go more and more to the general aviation pilot with probably a less standardized ground school background, we are going to have to do something that assures us that as he comes to the airline he is going to have the military equivalent.

Now, that could either be done at the university or by the airlines themselves. If the airlines do it, they are going to absorb the cost. If the university does it, then in order to defray the cost, perhaps as John suggests it may have to be through student loans and that kind of thing, but that is expensive.

I mean, the military absorbs that cost, but when the airlines start having to go into basic flying instruction—ground school instruction—or the colleges have to do it, that is going to increase the cost tremendously.

Senator FORD. Captain, is there some way that once they get into this kind of program we are talking about, and I am referring to what the European carriers provide, should there be some kind of guaranteed opportunity at the end of that training?

Mr. DUFFY. Personally, and for ALPA, we do not necessarily see the ab initio training by our airlines as the best course.

As we suggested in our testimony, we think that the colleges of this country can produce the standardized product that we have been accustomed to in the airlines, and I think there is a missing link now, that when they come out of the 4-year curriculum, they are still short on time and maybe that can be made up with simulation, maybe with an academy, maybe with some specialized training.

But right now, we see such a rosy future for airline pilots in this country—I mean, we just see this tremendously expanding demand that I do not think we are going to have to worry about the candidates coming forward, because they are going to see a happy future for themselves.

Senator FORD. There is a quite impressive operation going on at Greater Cincinnati Covington Airport to become a hub. Many who are pilots are moving into that area and they are making an impression on those who are seeing their professionalism, their level of society and, the homes they are able to buy.

It is beginning to make an impact on the attitudes of local people. It is an impressive thing, to watch it progress. As the hub grows and more members are associated with the airline or the industry move-in, it has a great impact.

Of course, that is just locale, but there will be, I think, some spinoff coming from that based on the movement into the community.

One last question, captain. The National Transportation Safety Board made a recommendation to FAA on crew pairing. Do you have a public position on that yet?

Mr. DUFFY. It is a good first step. Unfortunately, it was a recommendation and for instance——

Senator FORD. The National Transportation Safety Board I doubt seriously could put a demand on FAA.

Mr. DUFFY. The FAA then followed it up with a recommendation to the airlines, rather than a regulation, and we are finding out now, as Eastern tries to crank back up, that they are not following that recommendation. We would like to see it a regulation—a mandatory requirement.

Senator FORD. All right. Captain Hof, what is, basically, the background of the pilots you hire? Do you find their basic qualifications as good as they were several years ago?

Mr. HOF. Yes, sir, we do. American has a competitive selection process that perhaps takes the longest time, according to the applicants, and is the most complex in the business today.

It is a three-phase process and at each step along the way the candidate is graded and the results of that are provided to our Pilot Selection Board, which I Chair and which meets every two to four weeks to select the next classes of pilots.

We have been in a successful position at American and I believe we are an employer of choice for pilots and others as well and as a result of that we are well satisfied with the quality of the applicants and the number of applications which we receive to process.

Senator FORD. You may have mentioned, and I am not sure—I looked for your testimony and I saw you had yours handwritten down there so we did not get the printed part of it, and you mentioned that 100,000—was it hours, or days, training annually?

Mr. HOF. We run just under 100,000 student days annually.

Senator FORD. How many students, then, does that amount to? You said 600 pilots per year?

Mr. HOF. Well, we train all of our flight crew members at least annually. Co-pilots and engineers get recurrent training annually. Captains come back twice a year for recurrent training and then the other student days are made up of new hires, transitioned to newer aircraft.

Senator FORD. How many new hires, then, annually, will you put out? That would be—new hires would be, initially, coming in with whatever basic qualifications you have from your competitive program.

Mr. HOF. We are running right now at a rate of 600 a year.

Senator FORD. Mr. Fredericksen, let me ask you this: when you say, regional carrier, what are they now? I thought Piedmont and U.S. Air were regional carriers? They are no longer, in my mind, regional carriers. They were for a while but they grew into national carriers. What are some of the members? Is it mostly what we would call commuter?

Mr. FREDERICKSEN. Yes, sir.

Senator FORD. The 19-seat, 34-seat, whatever it might be?

Mr. FREDERICKSEN. Well, I do not think we can characterize it by seat of airplane any more. We used to say we were the people who flew airplanes 60 seats or less. That has become history, now. Several of our carriers now operate 100-seat jets, with the expansion of the industry.

They are the people you think of as commuters—Air Wisconsin, Atlantic Southeast, Presidential are some that you may be familiar with on the top end. The smallest ones are the guys who operate fleets of three or four Cessna 402's.

Senator FORD. How many members do you have in your association?

Mr. FREDERICKSEN. Seventy-seven.

Senator FORD. What kind of concern does your association have that your regional carriers, the pilots they are hiring now have less flying hours than the hires of several years ago?

Mr. FREDERICKSEN. You know it is a concern. It is a concern among the people who are doing the hiring and if you talk to the people who are doing the hiring at air carriers, most of them will tell you now they are interviewing more people than they used to to find a suitable candidate, somebody who can fly the airplane, and their washout rate in their training process is maybe a little bit higher than it was before.

But let me once again emphasize that the guy who comes out at the end of that training pipeline has the same qualifications as they ever did, if not better, and I think our excellent safety record emphasizes that.

Senator FORD. Is there a competition from the cargo group? It seems to me, I see more of those expanding. The fifth or sixth largest airline in the country is UPS, or somebody like that. Captain Duffy, is that competition bothering you any?

Mr. DUFFY. Well, it is going to be significant for the regionals. I do not think it will bother American, or Delta, or any of the tops of the majors, but as you get down into the lesser-paying airlines it is

more attractive in many cases to go to the better paying cargo lines.

Senator FORD. Thank you all very much. Senator McCain?

Senator MCCAIN. Thank you, Mr. Chairman, and Captain Hof, I did read your written statement. Thank you for the commercial for American Airlines.

You mentioned in response to the Chairman's question that you hire 600 pilots a year. Is that correct?

Mr. HOF. Yes, sir.

Senator MCCAIN. You did not mention that 91 percent of your pilots are military pilots—91 percent, according to statistics. Do you agree with that?

Mr. HOF. Well, I cannot verify that number.

Senator MCCAIN. You cannot verify that number and you are in charge of the program?

Mr. HOF. We keep track of the source of our pilots by where we hire them from—if they come from a regional carrier or they are just out of military service—and that is the way we track that.

We have some pilots who came from other air carriers or corporate enterprises who were trained in the military, but since their military training spent many years in other than an airline environment.

Senator MCCAIN. Well, according to two different sets of statistics that I have, one of them being from the government, 91 percent of your pilots are former military, whether they are direct from the military or indirect.

You are responsible for siphoning off a large number of military pilots and obviously you are satisfied, as you say, with the quality of pilots you got, with the quality of applicant. However, the fact is that you are getting $6 million men, according to the Chief of Staff of the Air Force, for a job that requires about a $100,000 education.

Delta Airlines says 95 percent of their pilots are ex-military as well. So the fact is, Captain Hof, that the major carriers are the ones who are hiring most of the people out of the military.

Obviously, they have more to offer. I think that makes sense. It therefore means to me, very frankly, that the major airlines should be picking up a share of this burden, since the taxpayers are paying for their education and training to the tune of millions of dollars.

To the point where General Cassidy, Commander-in-Chief of U.S. Transportation in MAC, testified before the Committee on which Senator Exon and I serve as saying the shortage of pilots is a war-stopper. A war-stopper, I might remind you, means that we cannot fight because of our lack of military pilots. He says, "My concern as Commander-in-Chief is I could run out of people before I run out of equipment."

So I would hope, Captain Hof, that you would go back and recognize that you have some responsibilities to this Nation's security—you are benefiting from the taxpayer's dollars, which are expended in the millions of dollars per pilot—and that American Airlines would be interested in helping us come up with solutions that other witnesses are examining today.

Captain Duffy, I almost hate to raise this subject with you again. That is the subject of extending—by the way, I appreciate your tes-

timony. I think it is eloquent. I think it is right on the mark and I think to some degree it is very objective, because as a representative of the pilots you also show a deep concern about this Nation's national security, so I appreciate your statement very much.

I know that amongst the members of ALPA this subject of extension of age is a very controversial issue and it has surfaced once before, and you are very weary of that battle.

Just explore with me a second the possibility of some kind of a "test pilot" program, of taking a number of pilots that would be interested in remaining an extra couple of years and placing them under a special set of conditions concerning physical examinations, et cetera.

Would you be willing to at least explore something like that with me and the other members of the Committee?

Mr. DUFFY. Senator McCain, you accurately put it. It is a tough subject for us because it splits our organization about 70/30. About 70 percent of them want to keep the age of retirement at 60 and 30 percent of them want to extend it.

As I told you when we discussed this before, it is my feeling and the feeling of our Air Medical Office that when we opened this question the additional physical requirements that are going to have to come with it, starting at age 55, or whenever—at age 50—and the inaccuracy of the predictive nature of the tests, are going to expose pilots to being eliminated prior to age 60 and I am not sure we are going to get a net gain out of the whole thing.

The bottom line for us, it has come out of the National Institute of Health Studies, it has come out of—when the FAA studied it this last time, they said there is substantial scientific evidence which indicates that the greater experience of the pilots who have reached or passed age 60 does not outweigh the increased risk of incapacitation or skill deterioration which accompanies their seniority.

Every time we look at it, no matter how many times we shake it up and lay it out there again, that is the bottom line and we just do not think it is a productive program. I wish it was, because it is seemingly an instant solution to our problems, but as soon as you open it up, it has got another whole set of problems that come with it.

Senator MCCAIN. We are all struck by anecdotes and by events, but when we see the pilot of United Airlines with a hole the size of a barn door in the side of his airplane, bringing that airplane in absolute safety and that being his next-to-last flight, you say wait a minute, this guy should be able to continue.

But I would like to explore it with you some more and the organization, because I think given the criticality of the situation, at least it is worth looking at again.

Mr. Fredericksen, thank you for your testimony. Do you think that the programs which will be explored by our later witnesses, combinations of airlines, or carriers, or groups such as yours, associated with colleges and universities, is an important way that we could alleviate this problem?

Mr. FREDERICKSEN. Absolutely. That is really our hope for the future, senator.

Senator McCAIN. If you had a chance to examine the program, say at North Dakota, at the University of North Dakota and some of the things that have been done at Embry Riddle and other places around the country?

Mr. FREDERICKSEN. Senator, we are very familiar with those schools. Yes, they are very active in this business.

Senator EXON [presiding]. Senator McCain, may I break in? At the conclusion of Senator McCain's questions we will recess temporarily until we get back from the vote. Go ahead.

Senator McCAIN. Thank you, Mr. Chairman. But you believe that that would satisfy many of your requirements, that kind of output?

Mr. FREDERICKSEN. I think their output now is minimal, because they are just starting up, but they have the potential to really put out some pilots who we can use.

Senator McCAIN [presiding]. It would probably require some more investment in things like simulators.

Mr. FREDERICKSEN. That is right. That money has to come from somewhere. Those machines are expensive, as you know.

Senator McCAIN. Thank you. If we could stand in recess for about 5 to 10 minutes, while we go and vote, we will be back, if this panel would remain, because Senator Exon has questions for you.

[Recess.]

Senator FORD [presiding]. Let us see if we cannot continue our hearing. I understand that maybe Senator Exon wished for these present three witnesses to stay while he voted so he could and come back and ask them some questions. I am tempted to go ahead to the second panel.

Senator Exon seems to want to ask a question or two and he has gone. I thought I would go ahead to the other panel and then, if you all do not mind waiting around a few minutes, Senator Exon would like to ask questions. I would like to go ahead with the other panel, because they have been waiting since 9:30. You all have to wait now, until he gets back.

One question I really had in mind, maybe Captain Duffy and Captain Hof can tell me. Do you all encourage the continuation of affiliation with reserves, or the National Guard or things of that nature? John, do you all do that? Do you encourage that? Because you are coming from the military and you are pilots? I think Senator McCain said 91 percent of them. I am not sure whether his figures are right or not, but he is seldom wrong. He researches pretty well. Is there an affiliation?

Mr. HOF. The answer to your question, sir, is yes. There was some discussion, after you had to leave the room. With your permission I would like to respond to Senator McCain's comments, but I would like to do so after he returns.

Senator FORD. That would be fine. Captain Duffy.

Mr. DUFFY. The continuation of the military obligations by affiliating with National Guard and reserves is quite common. One reason is the B scale. It is a way that a pilot during the first couple of years with the airline, when they are not making that much money, can supplement their income and I think it is standard in most of the airline contracts and probably is a matter of law that they be given time off to pursue that affiliation.

Senator FORD. Do you all do the same thing in the regional airlines?

Mr. FREDERICKSEN. Yes, sir.

Senator FORD. Why do we not then allow you three to retire for a few moments until Senator McCain and Senator Exon come back, and we will start with the other three.

So we have General Tallman, President of Embry-Riddle Aeronautical University, Dr. John Odegard, School of Aeronautics, University of North Dakota, and then Mr. Tony LeVier, Director, S.A.F.E., Inc., from California. So General Tallman, if you would like to proceed?

STATEMENT OF LT. GEN. KENNETH L. TALLMAN (RET.) PRESIDENT, EMBRY-RIDDLE AERONAUTICAL UNIVERSITY, DAYTONA BEACH, FL

General TALLMAN. Thank you, Mr. Chairman. I am pleased to have this opportunity to appear before you today. I believe that the shortage of trained and qualified pilots for the airline industry does constitute a growing problem for the Nation, but I am convinced that the problem is not due to a lack of interest in the profession by young, aspiring aviators.

Earlier we heard some figures mentioned here in the hearing about the reduction in student pilot certificates. I think if we investigate that further we will find that this reduction is primarily in the area of private pilot and it involves those people who just want to get a private pilot certificate, and that number is declining due to the increase in cost.

If you look at the enrollments in our universities and colleges in our flying programs you will see that we have record enrollments today; so the shortage persists not because of a lack of young, aspiring aviators but primarily because the move from these basic certification training programs like the commercial instrument program (such as the one at Embry-Riddle and other universities) to the air carrier cockpit takes place only after these entry level pilots meet the experience requirements imposed by the industry.

Now, unless the fledgling pilot that graduates from the university program enters the military and gains the necessary experience, he or she really has, today, no structured path to follow which would lead with any certainty to an airline cockpit.

Let me use some statistics from Embry-Riddle University to amplify further this dilemma. Of our 2,000 plus annual graduates, about 400 typically will be pilots who have completed a baccalaureate degree and have completed the basic certification program—usually, commercial instrument ratings plus a certified flight instructor rating.

Of these 400, about 50 will go into the military either through our ROTC program or one of the service's officer training programs. The remaining 350 pilots, together with close to 5,000 other pilots with similar ratings from other universities and college programs, will be cast into what I call the great unknown. In other words, these are pilots who aspire to be airline pilots, and there is no structured path for them to follow.

The main point here is that each year this country produces a large number of pilots with the basic commercial certification qualifications. In 1988 alone, the FAA issued over 12,000 new commercial pilot licenses.

But the availability of military-trained pilots over the years—and you heard about the 95 percent at Delta and the 93 percent at American with military background—this continued availability of military-trained pilots over the history of this industry has been a disincentive for this country to establish a civilian system designed and tailor-made to bridge the gap between university flying programs and airline qualification.

I firmly believe that this country ought to structure a concentrated, professionally structured training program that can be an effective substitute for in-flight experience. I agree with Mr. Fredericksen that for too long we have measured experience solely by flying hours.

In our military services, as was pointed out earlier, they clearly have accepted this reality for almost 50 years; and they have been able to man the cockpits of the world's most sophisticated airplanes with young people who have a minimal number of flight hours, and that is because they have a structured training program—a structured sequence of training from primary, up through the advanced levels.

Now, interestingly enough, the requirements to achieve the commercial pilot certificate are pretty similar to the requirements, in terms of flying hours, to receive the basic military pilot rating, but the difference is the kind of equipment flown and the type of training that goes on.

But there the similarity ends, because following completion of the commercial pilot certificate there is no structured follow-on path for the young person to follow if he or she wants to get into air carrier duty. They have to fend for themselves.

I mentioned earlier the great unknown. You know, he or she might become a flight instructor, or hire on as a charter or air taxi pilot and progress after several years through a regional or commuter carrier to a major air carrier. I have even got a couple of examples.

In preparing for the hearing, I asked our alumni director to go talk to a couple of Embry-Riddle graduates who are now working for a major air carrier and ask them how they got into that job. These were graduates who did not go through the military.

Tim worked as a co-pilot and mechanic for Trans-Florida Airlines while attending Embry-Riddle. After graduation he spent about a year flying the right seat on a Convair for Dow Jones, flying "Wall Street Journals" at night.

After building up about 500 hours he was laid off and he towed banners in St. Petersburg, FL for a couple of months. Then he was hired by a night freight company flying Convairs and he had this position for about 15 months.

He built up his flying time to 2,000 hours. He was finally hired by ASA, a commuter in Atlanta, where he worked for about 6 months before being hired by Piedmont.

I have many other similar examples of graduates who did not go through the military and by one way or another, by hook or crook,

acquired the flight hours required to be considered qualified for hire by the air carrier I say that the country ought to recognize that we need a structured program that is not based upon how many flight hours are logged, but is based upon developing and using the latest state-of-the-art techniques and equipment in training our people to fill the gap between this basic certification training and the airline qualification.

I think that this country can solve this problem in two steps: the first step the FAA I believe is already taking and moving in this direction, and John Kern talked about changing the regulatory requirements. I think they are moving in the right direction to establish a performance-based standard upon which to measure an individual's proficiency and decide whether or not they are qualified to become an air carrier pilot.

Second, and this is the tough one, the FAA should invite the aviation training industry to establish a network of centers to provide this appropriate, upgrade training to meet these performance-based standards.

Now, as mentioned by Mr. Fredericksen, we already have some examples of this, I agree with him, that the TWA Flight Safety example in St. Louis is a very, very good one. But these programs do not go far enough, and they are not large enough in scope to even come close to solving our problem. But such a training program on a national scale, in my view, would ensure the most effective state-of-the-art training syllabi, equipment and techniques, as I mentioned before.

If we had a program of this kind it would accomplish four things, in my view. It would establish a realistic, measurable level of quality based in performance. It would reinforce confidence in our air transportation system. It would signal young people desiring an airline pilot career that there is a structured and standardized path which leads to the airline cockpit, and I am also convinced, fourth, that it would reduce the demand on our military to provide experienced aviators for the airlines. It would aid the military in retaining a greater number, and it should certainly save on the exorbitant replacement training costs that face the military today.

It is my hope that this hearing will focus on this as a national problem with far-reaching implications, and that a solution will be found to provide this alternate, structured path for our fledgling civil aviators.

Last, Mr. Chairman, I am optimistic that the resources needed to resolve this shortage are available and affordable today.

Thank you.

[The statement follows:]

STATEMENT OF KENNETH L. TALLMAN, LT. GEN. USAF (RET.), PRESIDENT, EMBRY-RIDDLE AERONAUTICAL UNIVERSITY, DAYTONA BEACH, FLORIDA

Mr. Chairman, Members of the Sub-Committee, I am pleased to have this opportunity to appear before you today and address the national pilot-shortage problem.

As President of a university which is totally aviation oriented and produces over 2000 graduates a year for the aviation and aerospace industry, I have become increasingly aware that the shortage of trained, qualified pilots for the airline industry constitutes a growing problem for this nation. Most estimates indicate a continuing high demand for the limited experienced aviator resource well into the next decade and beyond. I am convinced that the problem is not due to a lack of interest in the profession by young, aspiring aviators. In fact, enrollments in pilot training programs are approaching record levels at most universities and training schools. Rather, the shortage persists because currently the move from basic certification training programs (such as the one at Embry-Riddle and other universities) to the air carrier cockpit takes place only after entry level pilots meet the experience requirements imposed by the industry. Unless the fledgling pilot enters the military and gains the necessary experience, he/she really has no structured path to follow which will lead with certainty to an air carrier cockpit.

Let me use some Embry-Riddle statistics to amplify further this dilemma. Of our 2000 plus annual graduates, about 400 typically will be pilots who have completed basic certification training programs. Of this figure about 50 each year will enter one of the

military services either though our ROTC programs or directly through one of the service's officer training programs. The remaining 350 pilots, together with thousands of others completing similar training at universities or training institutions will be cast into the great unknown.

The point is, that each year this country produces a large number of pilots with basic commercial certification qualifications. In 1988 alone, the FAA issued over 12,000 new commercial pilot licenses. However, the availability of military-trained pilots over the years has been a disincentive to establishing a civilian system designed to bridge the gap between that basic flight training and airline qualification.

I believe a program of concentrated and professionally structured training can be an effective substitute for in-flight experience. Our military services have clearly accepted this reality for almost 50 years and have been able to man the cockpits of some of the world's most sophisticated aircraft with young college-educated, minimally experienced pilots. They accomplish this through a structured sequence of training from primary to advanced levels.

Interestingly enough, the requirements to achieve a commercial pilot certificate, the rough equivalent of basic military pilot certification, are similar to those of the military in terms of flying time. The difference is the kind of equipment flown (normally general aviation light aircraft), and the training requirements. Effective oversight is provided by the FAA in terms of program regulation and certification. But there the similarity ends - following completion of the commercial pilot certificate, there is no structured follow-on flying course to prepare the new pilot for air carrier duties.

The aspiring air carrier pilot must instead fend for himself/herself by seeking out opportunities to build up experience. He/she might become a flight instructor or hire on as a charter/air taxi pilot and eventually progress after several years through a regional/commuter carrier to a major air carrier.

Fortunately, we are starting to see examples of civilian "advanced" flight training programs but they are far too few in number and in scope to solve the overall shortage problem. Both air carriers and training organizations have established airline transitional programs designed to upgrade the qualifications of low-time pilots so they are acceptable as air carrier pilots in a regional/commuter cockpit. One problem with these programs is that at present all training costs (between $5,000 and $13,500) are borne by the trainees - who have normally just been saddled with the costs of acquiring their commercial certificate.

In my view, one solution to this overall problem is clear, and it involves a two-step process: the first step is to have the FAA focus on the nature of the problem in conjunction with the air carrier industry and other members of the aviation community, by developing and promulgating a performance-based standard which will serve as the minimum requirement for hire by a commercial air carrier. The FAA's proposed Advanced Qualification Program approach is an excellent step in this direction.

Second, the FAA should invite the aviation training industry to establish a network of centers designed to provide appropriate upgrade training to meet these performance

based standards. Such a training program should ensure the most effective, state-of-the art training syllabi, equipment and techniques. Costs could be equitably borne by all participants - industry, government, as well as the trainees.

Establishment of this jointly-structured, advanced training program would serve a fourfold purpose; namely:

1) It would establish a minimum, measurable level of quality based in performance.
2) It would reinforce confidence in our air transportation system.
3) It would signal young people desiring an airline pilot career that there is a structured and standardized path which leads to the airline cockpit.
4) It would reduce the demand on our military to provide experienced aviators for the airlines, thereby aiding the military in retaining a greater number of their pilots thus saving replacement training costs.

It is my hope that this hearing will focus attention to this national problem and its far-reaching implications, and that a national solution will provide an alternate structured path for our fledgling civil aviators. I would like to applaud the subcommittee for addressing this issue; for giving it the visibility that is going to be required to achieve a solution and to state that I'm optimistic that the resources needed to resolve the airline pilot shortage in the United States are available and affordable. Thank you for inviting me to attend this session, and I'd be happy to answer any questions.

Senator FORD. Thank you very much, General. Dr. Odegard.

STATEMENT OF JOHN ODEGARD, DEAN, CENTER FOR AEROSPACE SCIENCES, UNIVERSITY OF NORTH DAKOTA

Mr. ODEGARD. Mr. Chairman, I will attempt to be very, very brief and not repeat anything.

Senator FORD. Maybe that leaves you very little to say.

Mr. ODEGARD. I am down to four lines I have left.

Senator FORD. Your total statement will be included in the record, as if given.

Mr. ODEGARD. You asked us to testify on the ability of the academic community number one, to respond to the problem we are talking about today, number two, identify the elements of training that are essential, and number three, offer suggestions of what the Federal Government can do. I am going to focus only on those issues and stay away from some of the other things that we have talked about.

However, I would like to mention, when we are talking about the pilot shortage and we are throwing numbers around of 60,000 pilots that we are short for the next ten years and so forth, which are staggering numbers, there are really questions in a lot of people's minds as to how we are going to satisfy that. There is another element that we have not talked about in that if you look at the pilot shortage in the free world, a study was recently done by British Aerospace that was not released. It is looking at some kind of numbers to the year 2010 of about 240,000 pilots short in the free world.

Now, why do we care about that? Two reasons. Number one, the majority of our flight training is done in the United States. Lufthansa, KLM, SAS, China Airlines, Evergreen, Gulf Air—on and on and on, all of these folks are doing this training in the United States.

Number two, there is an expanding effort, and I think Captain Duffy and others could respond to that, of foreign carriers hiring U.S. pilots and hiring them away from U.S. airlines to fly for foreign carriers. So although that 60,000 number is a very, very large number and indeed one we need to be worried about and figure out how we can solve, it is in fact even bigger than that.

We had testimony from American Airlines and you would probably have many other major carriers that would say there is not a pilot shortage. They are getting wonderfully qualified people, and indeed they are. But they certainly do not speak for all airlines and I think we heard John Fredericksen mention that some of the commuter airlines are running 40 to 50 percent turnover. I am familiar with one regional carrier that one year had 140 percent turnover, which is a very, very staggering thing.

Now, that is a problem for them. But we are at the end of the food chain. We are sitting in all the colleges and universities and the regional and the commuters eat our seed corn, because as the domestic carriers hire the regional pilots, the regionals come and hire all of our flight instructors.

We are where it all starts and that is a very important issue, because if we do not have flight instructors, we do not have all of

these types of collegiate programs across the country providing these kinds of people, we are all in a world of hurt.

Then, of course, there is somewhat of a safety issue. So let me suggest quickly that there probably is no single short-term solution. My colleague has recommended a gap-filler type program that has been discussed and that commercially is happening a little bit right now. That is fine. It is a short-term potential solution, but not certainly a long-term fix for the problem.

Years ago—in fact, 40 years ago—the Germans through Lufthansa started ab initio airline training, selecting very, very carefully, candidates prior to being pilots and taking them all the way through zero time, ab initio, to airline pilots. They have done that for 40 years. Great Britain has done the same thing.

We are now looking at and doing that in the United States. The United States has done that from a military standpoint. We have heard testimony this morning that the military services can take a person from zero time to 300 hours, or 290 hours, and they are a qualified co-pilot in a C–5A or a qualified pilot in an F–16.

So that type of training is indeed effective and I guess I would say that I am a very strong advocate of adapting and enhancing an ab initio style pilot training to start solving the training problem for our future airline pilots of this country. That may be a first critical step that we need to take, if we are going to have a reliable system in years to come.

The infrastructure for accomplishing that, gentlemen, is already in place. There are nearly 400 colleges and universities with aviation programs across the United States.

Today, at this very moment as we sit here, there are over 10,000 students that are enrolled in professional flight programs in those colleges and universities and that enrollment is expected—if the facilities were there, that number is expected to double in the next 10 years.

In fact, the executive director of the University Aviation Association, Gary Kiteley, who represents all of those colleges and universities, is in the audience today.

So we are concerned and we need to focus on how do we start preparing the young people that are in our colleges and our universities today to be the airline pilots of tomorrow, when tomorrow is really here? Number one, the need is here today. Number two, the technology is dramatically changing.

I flew here yesterday in an Air Bus 320, fully automated, fly-by-wire, completely electronic airplane and now in service in the United States. The types of training and the things we need to do in the certification process and how we prepare young people today to fly those kinds of airplanes is different than the kinds of training and the certification that we are doing through the FAA currently. So there are some changes that need to be made.

We attacked that problem by developing a program in cooperation with Northwest Airlines over a 2-year period and spending a lot of money. We were very fortunate to be teamed up with Northwest Airline to first, do a task analysis and determine every single task that a pilot today needs to know to fly an Air Bus 320, or a 747–400 and so forth, and then, to build a program of how to teach

somebody the necessary skills in order to operate that kind of equipment.

The task analysis that we did pointed out something very important. In the past, we have focused on all traditional flight training on an aircraft—how do we maneuver the aircraft in the airspace that we are flying in and in the weather that we are flying in.

But we have not focused on the human factors of the pilots themselves. The program that we have developed for ab initio training has in fact done that, and we think this is the type of training that we will eventually be able to make available to our other colleges and universities across the country to provide a very rigorous, high-standard program to satisfy the requirements for the commercial airlines and in fact even military requirements, if that is necessary.

I said I would be brief. Let me skip just to my conclusions and recommendations. First, encourage a regulatory environment that will facilitate innovation. John Kerns' heart is in the right place and he talked about all the things the FAA wants to do, but the fact is they are all bound up in regulation and things that prevent them from doing what they want to do. Somehow we have to break that logjam so that we can have innovative, creative new methods of doing things and get them in place quickly.

Second, support aviation research grants and access to our academic resources. We have terrific resources available in our colleges and universities to start solving and doing some of the research necessary to solve these problems and we need to get access to it. There in fact are some bills pending in Congress right now that would facilitate that.

Third, develop a national policy on aviation education, and a policy that would foster aviation. I believe the Secretary of Transportation, Mr. Skinner, announced recently an initiative to develop a national transportation policy and maybe an aviation education policy should be part of that.

Fourth, provide financial assistance to the existing infrastructure. For a number of years, Congress has seen fit to spend some money in the airway science program through the FAA to build facilities, to buy simulators, to do some of the things that we need to enhance the infrastructure to solve this problem. That needs to be significantly expanded.

Last, establish a structure of grants and loans to students so we can have a cross-section of young Americans, not just the elite that can afford it, but a cross-section of young Americans who have the capabilities and have the intelligence and have the skills to be the pilots of the future both in the military and in the commercial sector.

So I think the solution is easily at hand. We have this entire infrastructure of colleges and universities that are in place, that need help. We have the students that are highly motivated, excited about this career, and all we need to do is help them along. I think we can solve this problem fairly fast.

Thank you, sir.

[The statement follows:]

TESTIMONY

U. S. Senate Committee on Commerce, Science and Transportation

John D. Odegard, Dean
Center for Aerospace Sciences
University of North Dakota

Senators, ladies and gentlemen ...

A good morning and thank you for inviting me to appear as a witness before this committee on the subject of a nationwide pilot shortage.

You asked me to testify on the ability of the academic community to respond to the need for pilot training and to identify elements of training that are essential to the safe functioning of aircraft today and in the future. You also asked for my suggestions on how the federal government might assist in the process.

First, let me touch briefly on the issue of the pilot shortage itself, or more specifically, the impact of the shortage. The statistics are staggering. In less than a decade, industry officials estimate a need for between 40,000 and 60,000 new commercial pilots. In large part, the problem is a result of massive pilot retirements, fewer ex-military pilots, and explosive industry growth -- growth which is expected to double to one billion enplanements by the turn of the century.

At present, most of the major airlines are not affected. With fewer ex-military pilots on which to draw, they are recruiting pilots away from the commuter or regional airlines in record numbers. In fact, the turnover rate for these smaller air carriers is averaging about 60 percent annually and is sometimes as high as 120 percent.

In turn, the commuter/ regional airlines are "eating the industry's seed corn" by recruiting flight instructors away from the nation's flight training programs. According to an aviation safety report prepared by the U. S. General Accounting Office, new commuter copilots are increasingly upgraded to captain in just six months; ten years ago these new hires typically spent several years as copilots prior to promotion.

This turnover and its resulting decline in the relative experience levels of pilots is beginning to raise serious questions about maintaining air safety. Before long, the major carriers, too, will be faced with difficulties of having fewer experienced pilots on which to draw, resulting in further pressure on a system already burdened.

There is no single solution. There are stop-gap measures that may ease the situation somewhat. However, these short-term remedies, while postponing the full impact of the pilot shortage, will not solve the problem. In addition to the pilot supply issue, we are also faced with a rapidly-changing aviation environment including trends toward full cockpit automation and increasingly congested airspace.

Great Britain and the Federal Republic of Germany have responded to the growing problem in their part of the world by establishing flight schools to train zero-time pilots to meet airline entry-level standards *ab initio*, which is Latin for "from the beginning." Furthermore, flight instructors at these schools are being paid salaries plus benefits that have risen often by more than 50% in the past couple of years.

In this country, ab initio pilot training has been used successfully by the military for decades. After 250 hours, a young pilot is typically put at the controls of one of the world's most sophisticated jet aircraft.

I happen to be a strong advocate of utilizing this ab initio approach for training the future civilian airline pilots in this country. I believe this may be an important first step in multi-faceted effort to preserve a safe and reliable system of air transportation in the years to come.

Where should the training take place?

A basic infrastructure is already in place that could be readily adapted to meet the crisis. I am speaking of the nearly 400 colleges and universities currently involved in aviation education and flight training. Over 10,000 students are enrolled in these professional flight programs. This enrollment is expected to double in the near future. (It is interesting to note that colleges and universities provided pre-flight instruction for the military in support of the W. W. II needs.)

Clearly, this collegiate infrastructure offers tremendous potential for providing the nation with an ongoing supply of qualified pilots. These institutions are uniquely qualified to adapt their traditional pilot training curriculums to meet specific airline training requirements. These changes are going to demand a depth of expertise not available to most non-academic institutions.

What training elements are essential?

Pilots who start their training today will soon be flying aircraft that are currently being designed -- most probably even hypersonic airplanes. Most flight certification requirements were established 30 years ago

and do not address many of the issues that have emerged with the advent of modern passenger airplanes with their advanced, computer-driven cockpits, fly-by-wire controls, and 18-hour flight legs. It has been difficult for training to keep pace with today's increasingly complex airspace and high traffic density.

To address these issues, the Center for Aerospace Sciences at the University of North Dakota and Northwest Airlines set out in 1987 to create a new pilot training program specifically designed to prepare pilots for the airline mission. Because no comprehensive source of information existed on what a pilot needs to know to function safely, even in today's aviation environment, a job task analysis was undertaken. Our goal was to "start from scratch" in identifying skills needed to fly every type of aircraft from a single-engine flying in VFR conditions to a fly-by-wire heavy transport category glass cockpit aircraft operating under degraded or emergency conditions.

This 1000-page document has provided an invaluable foundation for creating a new flight syllabus (called SPECTRUM) which is specifically oriented to airline requirements. Among the issues was how existing programs fail to place an emphasis on the pilot as an integral part of the system -- this despite consistent findings from the National Transportation Safety Board that human error is the primary factor in aviation accidents.

Historically, pilot training programs have focused on three areas -- namely the aircraft, the air space system, and the environment in which the airplane flies (mainly weather). The job task analysis emphasized the need to add a fourth dimension to the training -- human factors.

Our study emphasized the need to train pilots about how to work together as a crew, how to exercise good judgement, and how to deal with stress. SPECTRUM introduces human factors at the beginning and deals with it continuously throughout the entire program. We believe this approach to training must become a part of a standardized criteria for training and certification of pilots nationwide.

To facilitate this process, funding must be made available to research and develop new training methodologies for airline pilot training with financial support made available to implement them. The regulatory environment must become more responsive to changing requirements. Although a start has been made on this both by the FAA in its

own efforts and by a research effort proposed by the University Aviation Association, the funding is too little and the progress too slow.

Who will do the training?

This may well be the critical element in the equation for solving the pilot shortage. Currently young, talented flight instructors are being hired away from the instructional environment in large numbers to meet the needs of the commuter/regional carriers. This is causing both a shortage of instructors and an erosion of quality.

Historically, flight instruction has been a vehicle for people waiting to move to the airlines. It has rarely been a long-term profession. Furthermore, the requirements for becoming a flight instructor have never been particularly stringent with respect to teaching ability or knowledge of how people learn best. Mere knowledge of the subject matter has been the main criterion for certification.

No solution to the pilot shortage can work without an adequate supply of highly qualified flight instructors. A substantial investment is needed to provide this resource. This investment must include funding for establishing the criteria for certifying flight instructors and for training and retaining them.

Clearly, the universities have a major role to play. By their very nature, these institutions are interested in the processes of learning and instruction. They are the appropriate resource to be tapped to lead the effort to establish what instructors should know, how they should teach, and how they should be trained. In conjunction with the industry the universities must be given the opportunity to establish flight instruction as a lifelong career path with appropriate salary, benefits, and recognition.

Who is to be taught?

Aviation continues to be a dream for many of the country's youth -- a dream more difficult to realize today than in the past because of escalating costs. Two issues surface about who should be the pilots of the future. The first revolves around the appropriate aptitude, the second around who should pay.

Little is known about how to select from non-pilots those who will become successful and safe airline pilots flying the equipment of today and tomorrow. As cockpit automation increases, the role of the pilot

is changing from one who manipulates the control yoke to one who manages a complex computer environment. It is likely that the type of person who will be successful in the new cockpit is different from the one who flew in the old.

Funding must be made available to determine whether current techniques are now appropriate, for if they are not, money and resources will be needlessly expended.

We believe that there are adequate numbers of young men and women who want to fly to meet industry demands. However, a mechanism must be established that will allow them to finance their aviation education. Current training costs are beyond the means of most of the nation's young people. We would suggest that it is in the national interest to make pilot training accessible to all sectors of our society.

Conclusion

As usual, a crisis of this nature also provides an opportunity.

The opportunity that you have is to take a reasoned and practical approach to solving a crisis of national dimensions. You have the opportunity to make an impact on the situation in the short-term and, at the same time, to lay the foundation for a solution that is thoughtful, researched, and sufficiently flexible to handle the demands of the next 30 years.

I am convinced that the nature of flying and flight instruction has changed so much when it comes to training pilots for the airlines that the universities and colleges may well be the best place to conduct this training. For the most part, the basic infrastructure is in place, although much needs to be done to ensure it is able to meet the demands of the industry. Colleges and universities are in the business of education, they have the research capabilities needed to provide the foundation for the long-term solutions, and they are able to adapt.

I have the following suggestions for how Congress might assist in establishing a practical and robust solution to the pilot shortage crisis.

1. Encourage the FAA to develop a regulatory environment that will encourage and facilitate innovation and creativity in aviation training requirements and techniques.

2. Support the establishment of an aviation research grant program to provide the FAA with immediate access to the collegiate aviation research community, which is uniquely equipped to respond on aviation-related areas.

3. Develop a National Policy on Aviation Education to foster the development and support of collegiate aviation throughout the country. Such a policy should channel resources and support to assure the country's ability to provide for the aviation manpower needs well into the 21st Century.

4. Provide financial assistance to strengthen the existing infrastructure of university aviation programs. An expansion of the FAA Airway Science Grant Program would be an immediate and positive step.

5. Establish a structure of grants, loans, and loan guarantees to students of all backgrounds. Many aspects of the original National Defense Student Loan Program could be included for high demand areas, such as Air Traffic Controllers, Flight Instructors, and Maintenance personnel.

I thank you for the opportunity to address you.

Senator FORD. Mr. LeVier.

STATEMENT OF TONY LeVIER, PRESIDENT, SAFE ACTION IN FLIGHT EMERGENCY, INC., LaCANADA, CA

Mr. LEVIER. Thank you, Senator Ford, and distinguished members of your subcommittee on this very important issue. I just want to say that I appreciate that my good friend, Barry Goldwater, requested that you have me here.

Senator FORD. I do not give him any credit. He will take all the credit he can get.

Mr. LEVIER. Well, that is okay, but just let me warn you, if I do not do a good job, he will kill me.

Senator FORD. And if you do not do a good job, I will notify him. How is that?

Mr. LEVIER. OK. I would appreciate that.

Well, you know, it is kind of odd that I am the last man in these hearings. It reminds me of some 51-odd years ago when I was invited to speak at a very prestigious organization in Cleveland, OH, during the national air races and would you not know it, they had my good friend, Roscoe Turner, on first. And he kept saying everything I was prepared to say. And when I came to speak, why, I really did not have much to say because Roscoe had already said it.

And my distinguished friends here have already told you a lot of things that I am able to talk about, too, but in a slightly different way, so let me get on with what I have to say because what I do have is a little bit different.

My area of expertise being pilot training, I will not dwell on the question of how to alleviate the growing shortage of professional transport pilots except to suggest a partial near-term answer might

be realized with a temporary suspension of the regulation making retirement mandatory at age 60.

Given the present shortage of pilots, it strikes me that putting a well-trained, experienced pilot out to pasture without regard to his physical and mental capacity to continue flying is a waste of a valuable resource.

As to the future requirement for superbly trained transport pilots, I would encourage the adoption and incorporation into college aviation curricula programs like Spectrum, a unique ab initio pilot training program for the airlines. It has already been discussed, but I would like to add my thoughts.

Spectrum was developed jointly by the University of North Dakota's Center for Aerospace Science and Northwest Aerospace Training Corporation, a subsidiary of Northwest Airlines. My copanelist, John Odegard, has told you all about it. And I am in complete agreement with both of these gentlemen and their programs they have in their outstanding universities.

My own approach to improving pilot training is to begin with the recognition that flying is inherently dangerous. I want to emphasize that. What makes it acceptably safe is the reliability of a well-designed, well-maintained aircraft and the skill and judgment of the fully qualified pilot who operates it.

And I can digress just a moment and remind you of that tragic airline accident right here in the dead of winter out of your National Airport some 3- or 4-odd years ago. Two pilots were absolutely incompetent for the critical situation which they were flying under, and most pilots fly it all the time. It was absolute incompetence.

The airplane is a three-axis vehicle which can be flown, frequently must be flown in any attitude to escape the circumstances of danger.

FAA regulations governing pilot training for a private license do not require sufficient training for the average general aviation pilot to handle flight emergencies. Instead of requiring the pilot applicant to demonstrate his or her ability to recover from a stall, spin or other types of emergencies, the present regulations require only that students demonstrate the ability to recognize or be aware of the circumstances that induce stalls or spins.

Perception of danger is only part of the equation for a safe flight. A man balanced on the edge of a cliff is fully aware of the risk, but he must still suffer the consequences of the fall if he loses his balance and goes over the edge, and this is the problem in aviation today and always has been. And I can talk about aviation dating back as long as you want to go, 61, 65 years if you want dealing with this one part.

The environment of flight is filled with natural and man-made phenomenon, any one of which can and frequently does push the inadequately trained pilot beyond the level of his competency. In the six decades that I have been flying, mountains have not become perceptibly lower, nor have the winds that swirl around their peaks and gust through their canyons become less unpredictable. Wind shear still poses a problem for the most skilled pilots, and over water approaches and takeoffs and landings from air strips

surrounded by high mountain peaks still produce a visual disorientation.

Takeoff and approach techniques must still be adjusted to accommodate the reduced lift of the thin air at high-altitude airports. Wake turbulence still causes control problems for both large and small aircraft, and engines still fail at all altitudes.

And I might note at this point—I think you mentioned the accident at Denver, CO, a year or so ago. I happened to go through there the day before it happened and the day after it happened, and it was foul weather. And the two pilots were not too experienced, really, as it has been brought out.

But there is one thing that struck me—that every time I see an airlines take off—and you all watch them I am sure and see it—they have a procedure today called the "noise abatement" and they take off very rapidly. The rotation from a run down the runway in most cases is very rapid, and then the climb out is only a few miles per hour above the stall speed of the airplane.

Personally I consider that noise abatement procedure is dangerous.

Add to these risks are the problems accompanying the burgeoning growth of air traffic. More people are flying more airplanes to fewer but more congested airports. Air traffic control equipment is overtaxed. Air controllers are overworked. Operational flight hazards have increased commensurately, and urban sprawl is nudging the airport fence.

Given these and other ever-present potential risks of flight, I submit that it is illogical to continue to license a pilot to fly before he or she acquires the basic skills to cope with the risks. If it were in my province to do so, I would rewrite the rule book and require every pilot applicant to be able to execute the full range of emergency maneuvers to demonstrate his or her mastery of all pertinent phases of flight.

That would require levels of pilot skills to demonstrate recovery from full stalls, power on and power off, steep turns of at least 60 degree bank, spins and recovery from inverted flight. To attain that level of skill, I would increase the required flying time to a minimum of 60 hours, 25 dual and 25 solo with the remainder to be spent at the instructor's discretion working on the student's deficiencies. And once licensed, I would increase the currency requirements, the quality of flight instruction being germane to pilot training. I would tighten the rules to screen out that segment of instructor pilots who demonstrate the inadequacy of their own skills.

As a former accident prevention coordinator for the FAA observed, the fact that so many private pilots lack basic flying skills points to deficiencies in instructor techniques. As the comment implies, it's the need to upgrade the standards required for instructor's license. I and a good number of my colleagues agree.

Now, in closing, I have here a little booklet that I reprinted, "Safe Action in Flight Emergency, Inc.," Tony LeVier, President, salutes the Honorable T. Allen McArtor, former Administrator, Federal Aviation Administration. On this first page of the speech that he gave dated August the 8th, 1988, the title of his speech was "Better Pilot Training—the Key to Greater Safety."

The sixth paragraph down, and I will read it, "Pilot error is a factor in 66 percent of airline fatal accidents, 79 percent of commuter fatal accidents, and 88 percent of general aviation fatal accidents."

Now, I think Mr. McArtor picked this up from my stuff because I have been hitting that particular point for several years now, trying to steer everybody to the prime cause factor for aviation accidents. It is predominantly pilot error, regardless of what anybody says. These are statistics of the National Transportation Safety Board. That should be the top priority in this country for upgrading the quality of pilots or improving flight safety. And these two gentlemen on my left have the schools to do it.

Now, there must be, of course, consideration for the small flying schools. Small schools can do a good job providing they have good instructors and they know what they are doing. Most of them today do not. I rest my case.

[The statement follows:]

Presentation of Tony LeVier,
President, Safe Action in Flight Emergency, Inc.
Before the Senate Commerce Committee
Aviation Subcommittee
On Pilot Shortage and Training
August 3, 1989

Thank you Senator Ford and ladies and gentlemen of the Senate Aviation Subcommittee on Pilot Shortage and Training for the opportunity to participate in today's discussion.

My area of expertise being pilot training, I'll not dwell on the question of how to alleviate the growing shortage of professional transport pilots except to suggest that a partial, near-term answer might be realized with a temporary suspension of the regulation making retirement mandatory at age 60. Given the present shortage of pilots, it strikes me that putting a well trained, experienced pilot out to pasture, without regard to his physical and mental capacity to continue flying, is a waste of a valuable resource.

As to the future requirement for superbly trained transport pilots, I would encourage the adoption and incorporation into college aviation curricula, programs like Spectrum, an unique Ab Initio pilot training program for the airline mission. Spectrum was developed jointly by the University of South Dakota's Center For Aerospace Sciences and Northwest Aerospace Training Corporation, a subsidiary of Northwest Airlines, My co-panelist, John Odegard, who is dean of the Center For Aerospace Sciences, is the resident expert on Spectrum.

Nine years ago last month, I, along with 12 other witnesses, appeared before the House Subcommittee on Investigation and Oversight, to address the question: "Should Spin Training Be a Requirement For A Private Pilot's License?"

A post hearing summary of the witnesses position on the question revealed that 84% thought spin training was desireable, 77% said it was essential, and 69% said it should be required training. Represented were the FAA, AOPA, GAMA, NTSB, NASA, EAA & TAC, Lockheed, U.S. Army, Navy and Air Force and Science and Technology.

The consensus of opinion in that summary suggests that a solid majority of the witnesses favored mandatory spin training be included in the Federal Aviation Regulation (FAR). However, aside from some fine tuning of the regulations, subsequent to those hearings, the FAA opted for the same alternative it has advocated since 1949 when Stall/Spin requirements were dropped from FAR: Stall/Spin Awareness training. That's the type of training that teaches you to recognize an impending dangerous condition, cautions you to avoid it, and bids you sayonara if you inadvertently stall and spin out.

A reading of the Federal Register issued Friday May 26, by the Federal Aviation Administration covering proposed rulemaking, makes it patently clear, that the FAA has not had a change of heart since 1980. Citing a 1976 General Aviation Pilot Stall Awareness Training study by the FAA, the proposal for rulemaking notes that "The FAA agrees with the study's conclusions, though

FAA is not persuaded that spin training is necessary, or indeed preferable to stall awareness training. The study acknowledged that spin training "might not be feasible."

My advocacy of stall/spin training and other emergency maneuver training -- which predates the late 40s when the requirement was deleted from the regulations -- reflects a personal opinion I have expressed repeatedly among my peers in private conversation and to public audiences whenever an appropriate forum presented itself.

It was born of the same concern for flight safety that prompted the subcommittee to examine the question of pilot training. The apparent effectiveness of the FAA's stall awareness program in reducing the rate of stall-spin accidents does not alleviate my concern for flight safety nor does it change my view about the necessity for the spin training requirement.

A pilot whose training is limited to the perception of danger but which precludes learning the skills to avoid it will -- - in an emergency -- be left to the mercy of his own fright and untrained reflexes. Only blind luck or the grace of God will save him.

Present requirements for a private pilot's license, I suggest, place too much trust in the former and overtax the generosity of the latter.

The fact is, there are still too many pilots flying who are not fully competent to control their aircraft and too many pilots who fly their aircraft in conditions beyond their capabilities.

These are the pilots who jeopardize not only their own lives but those of the passengers they fly, the lives of the crew and passengers of every other aircraft in the immediate airspace of their own and the lives of the individuals on the ground who occupy their potential crash sites.

The perception of danger is only a part of the equation for safe flight. A man balanced on the edge of a cliff is fully aware of the risk, but he must still suffer the consequences of the fall if he loses his balance and goes over the edge.

The environment of flight is filled with natural and man-made phenomena and one of which can -- and frequently does -- push the inadequately trained pilot beyond the level of his competency.

In the six decades I have been flying, mountains have not become perceptibly lower nor have the winds that swirl around their peaks and gust through their canyons become less unpredictable.

Wind shear still poses a problem for the most skilled of pilots, and over-water approaches, and takeoffs and landings from airstrips surrounded by high mountain peaks still produce visual disorientation.

Takeoff and approach techniques must still be adjusted to accommodate the reduced lift of the thin air at high altitude airports, wake turbulence still causes control problems for both large and small aircraft and engines still fail at all altitudes.

Add to these risks the problems accompanying the burgeoning growth of air traffic since deregulation. More people are flying more airplanes to fewer but more congested airports. Air traffic control equipment is overtaxed, air controllers are overworked, operational flight hazards have increased commensurately and urban sprawl is nudging the airport fence.

Given these and other, ever present potential risks of flight, I submit that it is illogical to continue to license a pilot to fly before he or she acquires the basic skills to cope with them.

Flying is inherently dangerous. What makes it acceptably safe is the reliability of a well designed, well maintained aircraft, and the skill and judgement of the fully qualified pilot who operates it.

The airplane is a three-axis vehicle which can be flown -- frequently must be flown -- in any attitude to escape the circumstances of danger.

If it were in my province to do so, I would rewrite the rule book. I would require pilots to execute the full range of emergency maneuvers training (EMT) necessary to demonstrate their complete mastery of all pertinent phases of flight. To attain that level of proficiency under our military flight training

programs requires 120 hours of instruction. Being a realist, I'll settle for a level of pilot skill that includes demonstrated recovery from full stalls, power-on and power-off, steep turns of at least 60 degrees bank, spins and recovery from inverted flight.

To attain that level of skill, I would increase the required flying time for a private license to a minimum of 60 hours -- 25 dual and 25 solo and the remainder to be spent at the instructor's discretion working on the student's deficiencies. Once the student received a license I would increase the currency requirements.

As one FAA authority put it recently, Those few solo landings we require each 90 days for currency just won't do very much for a rusty pilot. He may be quite legal, but he is still very unsafe."

Having argued the case for the spin training requirement, I would be less that candid, if I have led you to believe that the requirement alone will solve the problem of the inadequately trained pilot.

We are still faced with the question of who is to provide the spin training. If the answer to the question seems self evident, let me refer you to Mr. A. E. Ruggeri, Jr., a former accident prevention coordinator for the FAA, who observed that "The fact that so many private pilots lack in basic flying skills points to deficiencies in instructor techniques.

Mr. Ruggeri, mind you, was talking about a significant segment of today's flying instructors who train their students under the much less demanding requirements of current regulations than those I have suggested for consideration by the subcommittee.

His comment implied a need to upgrade the standards required for an instructor's license. I and a good number of my colleagues tend to agree.

To make spin training a requirement for a private pilot's license without concomitant action to improve the quality of flight instruction per se could lead to an increase in the rate of stall/spin accidents instead of reducing it.

Since the quality of flight instruction is germane to the question before the sub committee, let me briefly summarize my view of the current condition. There are of course, many highly qualified flight instructors at top notch schools across the country. But, there is also a segment of the fraternity who became instructors to accumulate flying time at little-or no cost, or because it was the only flying job around. In either case, the job is frequently perceived as a way-station to something better.

About the time this segment of instructional pilots becomes well enough qualified to instruct a student flyer competently, it moves on to other areas of the industry.

The best become airline flyers, test pilots, crop dusters, aerobatic stunt flyers, executive pilots or pipe and powerline patrol pilots. Too many of those who remain instructors do so because they haven't improved their own skills enough to qualify for more demanding flying jobs.

`I personally know flight instructors who do not let their students go as far as they should in the recognition of in incipient stall for fear the airplane will fall into a spin.

An instructor who has not mastered his own fear of a spin would find it difficult to teach a student to master his. Such a pilot is not only unqualified to teach spin training, he is unqualified to teach any kind of flying.

His are the students Mr. Ruggeri finds lacking in basic flying skills. His are the inadequately trained weekend pilots flying our crowded skies. His are the students that constitute an open invitation to air disasters.

Senator FORD. Thank you very much, Mr. LeVier.

General, there have been a number of suggestions for expanding FAA activities related to pilot development and training programs. And I think the good doctor related to some of those things. I think you are talking about taking the pieces of cloth and making it whole rather than leaving it all out there.

What assistance or guidance does the FAA currently provide to your university/college training program?

General TALLMAN. The FAA through its regional structure assists our university on a very frequent basis with regard to our training program and, of course, they inspect us periodically.

We have an advisor with the Orlando district office, and we have an advisor with the eastern regional office at Atlanta. And they come down. They inspect our program. From time to time they will fly with some of our instructor pilots to make sure that we are adhering to all of the regulatory requirements of the FAA. But they are very helpful, very cooperative, and make suggestions for improvement and any suggestions that we have on improving the regulatory requirements, then they will process through the Washington office.

At the same time we are in touch with Washington, with the Administrator's principal associates here with regard to flying training program requirements. So, FAA is a very cooperative organization. I think we are all sort of in this together trying to put out the best product.

Senator FORD. Mr. Odegard, do you basically get the same type of treatment that the general does at your school? I think I want you

to touch on those three items very briefly as to what you think can be done. But, do you receive the same kind of support basically, inspections and that sort of thing?

Mr. ODEGARD. That is a national program, and we receive the same kind of support. And the FAA in all cases is incredibly cooperative.

I think our frustrations that occur are the same frustrations that they face when we are trying to solve some problems. But, the procedures and the rules and their various guidelines and so forth do not allow that to happen.

The procurement process, for example, for getting research and development funds into any of the institutions in almost nonexistent from the FAA today.

Senator FORD. Research funds?

Mr. ODEGARD. Research funds.

Senator FORD. What types of research would you do?

Mr. ODEGARD. Let me give you a very, very good example, germane to this problem we are talking about.

We put together a consortium through the University Aviation Association of 24 colleges and universities to deal with how are we going to prepare the pilot for the year 2010. And I realize that is a couple of years away.

Senator FORD. We better be ready.

Mr. ODEGARD. We have a pretty good idea of all the things, for example, the task analysis that we had accomplished that identified what do we need to do to teach somebody today. Our concern was what are all of the trends that are going to occur between now and the year 2010 and how are we in higher education, because our mission is the creation of knowledge, going to put all of the resources together in these 24 schools, determine what those trends are, and then prepare curriculum as to how we are going to teach these pilots?

And the reason for that is the kids that are in our programs today are, in fact, going to be the captains flying hypersonic airplanes and full automatic fly-by-wire airplanes and so forth by the year 2010. So, it is the kids who are already here.

That program was started with the FAA with John Kern's office. We got the first phase of the study done quickly but bounced up against a brick wall of procedure and protocol and procurement practices.

Senator FORD. In the Federal Government?

Mr. ODEGARD. In the Federal Government. So, we are trying to get that going. There has been no provision in the FAA regulation for doing R&D grants as such to colleges and universities.

There are two different bills today, the broad agency agreement which might be helpful, and another bill that has been introduced by Congressman Valentine, I believe, that may be very productive in solving that kind of a problem.

Senator FORD. Mr. LeVier, you said that one of the quickest ways to maintain pilots and help the shortage was to eliminate the age 60 automatic retirement. Of course, we have lifted retirement most everyplace else, as you probably know.

We get into the arena of safety and public perception or imagery does create some apprehension, I guess, as it relates to safety. But

beyond that just give me a couple of quick shots as to what we can do to increase the availability of qualified pilots in the next decade.

Mr. LEVIER. In other words, are you including these retiring pilots?

Senator FORD. Sure. I take that as a given. You have made that recommendation.

Mr. LEVIER. Well, I never was in favor of the automatic retirement at age 60, and I recognized when I was Director of Flying Operations at Lockheed Aircraft Corporation I was faced with the same problem everybody else has: getting old. And we had pilots that were starting to show deterioration for various reasons.

The average person, and not only pilots, overindulges and wrecks his health. But that does not mean everybody does, not by a darned sight.

As a flight director of a major aircraft manufacturer I was among the first to recognize this, and I talked our management into providing an early retirement for pilots when required, but it was not meant that at age 55 it would be compulsory retirement. In fact, I urged that they should be able to go to 65 if qualified.

It turned out that many pilots were ready to retire at 60. On the other hand, I know of all sorts of pilots that have gone way beyond 60. In fact, you are looking at one right here, and I only last year disqualified myself from further flying because of my work and my eyesight is not quite as good as I think it should be.

I did flying—extensive flying right up to a year ago when I was 75. I tested an experimental airplane at the age of 71, and it happened to be a redesigned airplane that I brought to this great city in 1948 to sell to the United States Air Force as a trainer. It was the T–33 which became the most widely used jet trainer in the world.

I am getting a little off the subject there.

Senator FORD. I get carried away every once in a while myself.

Mr. LEVIER. But I am building up to something here. This is one of my great faults, Senator.

Senator FORD. It happens to politicians, too.

Mr. LEVIER. There is no reason in God's world why a healthy, well motivated person cannot go beyond the age of 60 flying an airplane. None whatsoever.

On the other hand, I know why it was brought about to be 60. If they had given the kind of a physical examination that should be given, they would have probably been washing out a lot of the ones down at 35 and 40.

I was faced with that same problem in my business. Again, dealing with people that do not take care of themselves. But what about the people that do take care of themselves? Look at me. I am not exactly dead yet, and I can tell you, I can fly any airplane they have got in the sky. I have done it. I have flown them all. I have flown 260 different models of airplanes. I have flown 20 airplanes on their first flights. This has been part of my life.

And as far as training is concerned, I have been deeply involved in this area, probably in many respects at a higher level than most of them in here so far.

Senator FORD. Mr. LeVier, would you get to one point that I need to know, and I need it in the testimony. Other than eliminating the

age 60 as a requirement, what would you do to increase the number of qualified pilots in the next decade?

Mr. LEVIER. OK. There are plenty of pilots out there. There are plenty of people, and young people want to learn to fly. There is no question that flying is expensive, but everything is expensive. You cannot just say flying is more expensive than anything else. To be a doctor, for God's sake, must cost a couple of hundred thousand dollars.

Well, a pilot should be taught to a very high degree of competency for each level. And the pilots are out there, and you have the funds in the Government that could be tapped for some of it.

Now, at one time, 50 years ago, the government sponsored the Civilian Pilot Training Program, CPTP. I know why they did that. It was in preparation for an emergency—World War II. There were schools that sprung up all over the United States. Big schools. Embry-Riddle was in it deep. Were you there then?

Dr. ODEGARD. I was not.

Mr. LEVIER. Now, the money is around because I have raised many thousands of dollars on a small scale to do what I am doing. I am giving flight scholarships to any civilian pilot that has not had Emergency Maneuver Training.

Now, you have been talking today about all this fantastic training, and all the simulation going on, and they are depending on the simulation, doing all this in between. In other words, to bring you up by simulation is OK up to a point. But there is no simulator that will simulate all three axes of the airplane in all 360 degrees of motion. Now, that is one of the problems.

When an airplane is upset, Senator, like, for instance, on a takeoff, an airplane suddenly hits wake turbulence from a large airplane long gone—it is past, it is out of sight. But this great, huge swirl of air—it is like a tornado—you cannot see it—and you hit that, whap, upside down you go. Generally it goes upside down.

In most cases, people that gets into it at low altitude are lost if they have not had the training to cope with it. They will go into the ground, bam, just like that. In many cases airplanes crash. Nobody knows why. No eyewitnesses—or the eyewitnesses say, well, they seemed to falter and bam, down into the ground.

It happens on approaches, too. It happened to me many times in my career very close to the ground. But my training allowed me to save myself. And others can do it, too.

Now, I have given out over 500 scholarships for Emergency maneuver Training in the last 5 years. I started this thing to help pilots in emergencies. You may have heard from Barry Goldwater or read some of my stuff, and about 300 of these scholarships have been used and some of my material here will explain the results. I welcome everyone to take it. There is a lot of stuff there. But you can take it and read it before bed, go to bed and read it—and some of it might even put you to sleep.

I have here a report from many pilots, and these are commercial ATR CFI pilots. These are people that are supposed to be absolutely superb pilots. But when I gave them this training—some of them have over 10,000 hours—they have never had Emergency Maneuver Training. And the reports from these people are most revealing.

We are not teaching civilian pilots to a high enough skill level. They need Emergency Maneuver Training. I want to emphasize what I am talking about. I do not call it aerobatics. That is a connotation of being wild and woolly and doing all these crazy things close to the ground. I do not advocate that.

I call it Emergency Maneuver Training, and every pilot flying an airplane and is licensed to fly and carry passengers should have it. It should be mandatory. But it is not mandatory. The training requirements for a civilian pilot in this country are substandard in my judgment except for a few schools I know that provide this training.

I am not sure about Embry-Riddle, but I know that John Odegard does provide it. And this can make a great, great difference in the quality of a pilot.

I have said a lot here. Do you want to hear more?

Senator FORD. Not right now.

Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman.

Mr. LeVier, I hope you have the opportunity to visit some of the simulators, state-of-the-art that we have now, because indeed they do give you emergency procedures, and they do provide—Mr. LeVier, please let me finish before you respond. I can assure you from having been in them and having been a pilot—I have not been a pilot with not nearly your depth and magnitude of experience, but having the benefit of several hundred night carrier landings that the simulators that we have today as compared with just a few years ago go a very, very long way toward satisfying most of the concerns that you have.

I think that might be the opinion of General Tallman and Dr. Odegard, who are very familiar with the state-of-the-art equipment that we have. I am not here to argue with you. I just would urge you to go out again, as I am sure you have in the past, and look at the simulators that we have today and see what they are capable of simulating.

Mr. LEVIER. May I say a word?

Senator MCCAIN. Yes, sir.

Mr. LEVIER. I am aware of these simulators, but they are not available to the general public at all. These are military simulators.

Senator MCCAIN. No, sir, Mr. LeVier. Northwest Airlines has a facility. American Airlines has a facility. Most of the major airlines have facilities as well as—now let me finish—I did let you finish—as well as at the University of North Dakota and other facilities throughout the country. Is that true, Dr. Odegard, General Tallman? Are you in basic agreement with that?

General TALLMAN. I am, yes, sir. Although we do not have the latest state-of-the-art simulators at Embry-Riddle, I am aware of the simulators at the places you describe.

Senator MCCAIN. Go ahead, Mr. LeVier.

Mr. LEVIER. I have to beg to differ a little here. I think we are talking about two different things. There is to my knowledge no simulator that goes through all the three axes completely. They are motion simulators, but they do not put you upside down, they

do not swirl you all around in an uncontrolled maneuver such as a spin or a tumbling maneuver at all.

They have these experimentally, but they do not have them available to the public at all.

Senator MCCAIN. Thank you.

Mr. LEVIER. Are you a pilot?

Senator MCCAIN. Yes, sir, I was for many years. But I, like you, chose to discontinue that for the safety of myself and those around me.

Mr. LEVIER. I flew one of the first simulators produced.

Senator MCCAIN. I understand your point, and I think you have made a very strong point here. I would like to go on to the other witnesses, and I appreciate what you have had to say.

My statement to you is I would just urge you to go out and look at some of the state-of-the-art simulation that we have today. Perhaps not as broadly available to the general population.

Mr. LEVIER. I have. I know what they are.

Senator MCCAIN. Fine, then. Thank you very much, sir. And I appreciate very much not only your friendship with Barry Goldwater, but the enormous contributions you have made to aviation for many, many years. For that I am very grateful. Thank you.

Dean, perhaps you can give us a little more information as to how the University of North Dakota became basically, with all due respect to our friends at Embry-Riddle, the leader in this effort that we are attempting to make and in some ways a model for what we would like to see going on throughout the rest of the country.

Mr. ODEGARD. Senator McCain, thank you for the compliment. However, the University of North Dakota did, in fact, become a model, and have what we have, because of the U.S. Congress.

A number of years ago our Senator, Senator Mark Andrews, was chairman of the Subcommittee on Appropriations, and through a series of airway science grants, we built a series of buildings, and we built an infrastructure. We also added money to it.

We have been in the business for about 20 years. Our program started very, very small with 12 students and two airplanes and today we have a lot of facilities, $35 million worth of facilities and simulators and over 100 airplanes.

Senator MCCAIN. How much of that was Federal Government assistance?

Mr. ODEGARD. A lot of the facilities were built with Federal Government assistance, facilities and equipment money. No airplanes, none of those kinds of things that we can generate revenue on our own.

Senator MCCAIN. So, if we wanted to upgrade facilities such as Embry-Riddle in Florida or various other facilities throughout the country that have kind of this basic infrastructure, you would anticipate it would require government or outside financial assistance of some kind, particularly where we are talking about capital, where we are talking about infrastructure?

Mr. ODEGARD. Absolutely. There is no secret that aviation for 15, 20 years struggled very, very hard throughout the academic community to become even acceptable because it was looked down on by the academicians. And there is tremendous competition for re-

sources on campuses, and none existed in most cases across the country, to do what we need to do across all of the other schools.

UND is an excellent model. UND and the facilities and what we can do are there because of the U.S. Congress, because of the help we received from the FAA, because of the airway science program.

Now, that is not to say that we have not invested millions and millions of dollars which we have, of course. But you helped make it happen. And if the other schools can follow that same model, the money needs to be available. These were the two key points, I thought, in my testimony.

Number one, we need money for the airway science program, facilities and equipment, F&E money, bricks and mortar, because that is the one hard thing that schools have a very difficult time coming up with. If they have the bricks and mortar, they can generate revenue to buy airplanes and do other things. So, you can have your program in place and you can even generate money to pay faculty salaries for that matter. But you need the basic infrastructure.

Bricks and mortar, that whole system is in place in the airway science program. It has been kind of a political program with some add-ons here and add-ons there.

The fact is that there was a lot of vision when it was put in place because it is now probably a key part of an infrastructure that can solve this problem.

And the other thing is that flying is expensive. If you are going into an airline ab initio-style program that goes through a 4-year program so the day you walk across the stage, you are a qualified Airbus 320, DC–9, 727 or regional airline copilot. That is an expensive program that is going to cost $80,000 over a 4-year period, no matter where you go to school.

But what a wonderful resource to be able to have a young person start college, be very, very carefully screened to go through a four-year program, walk across the stage and step into a Jetstream 31 or a DC–9 all ready, all qualified like we do in all disciplines and all professions across the board with the exception of aviation.

We can do that. The infrastructure is in place to do that. The colleges and universities are there. The kids are there. Those schools need facilities and equipment, and those students needs grants or loans or loan guarantees or something.

If you go to medical school, you can borrow $50,000 a year. If you want to go into aviation, the maximum limit from the Guaranteed Student Loan Program is $2,500. And yet pilots make good money and they have the capability of paying back those loans.

So, I think there is a quick solution to a long-term problem that could be very helpful.

Senator MCCAIN. General Tallman, do you basically agree with what Mr. Odegard just said?

General TALLMAN. I basically agree.

I would like to add one thought. My suggestion was to apply initially resources toward the establishment of a gap filler program building upon the already broad decentralized training base that we now have.

I agree with John that that broad decentralized training program can be improved over time working closely with industry and

working with the FAA, but we already have that structure that is producing, as I mentioned, over 5,000 basically qualified pilots a year.

The pilot shortage is here right now. Why do we not work on that? That is my point.

Perhaps in the long term, as John suggests, that could be the ultimate solution. But right now, we have the solution at hand, and I do not think it would cost all that much. Certainly, we would have to subsidize the students in the form of loans.

Perhaps there would be some capital investment required in terms of simulators and so on. But I think that we ought to go with that now and perhaps develop John's program over the long term.

Senator McCAIN. For the record, would you please submit to the committee a more detailed estimate of what would be required. I understand they would be ballpark figures on the costs that you might anticipate in order for us to reach that goal.

General TALLMAN. I would be happy to.

[The following information was subsequently received for the record:]

You asked that I submit to the Committee a more detailed estimate of what would be required to establish a network of training centers which would satisfy entry-level airline pilot requirements. Specifically, you asked for a ballpark estimate of what such a program might cost.

The first step would be to develop the appropriate regulatory guidance and standards for this new structured training segment, requiring a concerted effort on the part of the FAA, the air carrier industry and the training community. These new performance standards are needed to take the place of our long-standing reliance on flying hours as the sole measure of experience and ability.

The next step would be the development of a training program to meet these standards, as well as the acquisition of the physical resources necessary to equip the training centers. We envision that each center would require a facility housing simulation bays and equipment, classrooms and offices sufficient to accommodate the anticipated pilot training load. I should note that the capital for these training centers need not come from public sources. Where public support might be most appropriate is via loans and grants to those students undergoing the training, as we anticipate the cost per student at upward of $15,000 for a two-month course. If students are provided the wherewithal, private training organizations should have the incentive to fund the necessary facilities and training establishments. In this regard, I am advised that Flight Safety International has sufficient training centers to meet the current demand and is prepared to train 3,000 airline transition program candidates per year.

Thus, a national solution to the pilot shortage seems at hand and requires these actions:

(1) Develop regulatory guidance and standards with assistance from the air carrier industry.

(2) Determine annual entry-level pilot requirements and challenge private industry to gear up to accommodate the needs.

(3) Establish a federal program of loans/grants to assist students in financing airline transition program costs.

For such a program to be successful, it is incumbent on Universities with flying programs to insure well-qualified candidates for the airline transition program. Specifically, greater emphasis should be placed on multiplace crew experience and airline pilot proficiency development in basic flight training schools.

Senator McCAIN. Just one more question, General Tallman. It is my understanding that Embry-Riddle has two facilities, one in Florida and one in Arizona, is that correct?

General TALLMAN. Yes, at Prescott, AZ.

Senator McCAIN. Let us take the one in Florida. How much of a capital investment would it require roughly in order to bring it up to the level of University of North Dakota?

General TALLMAN. Well, I have not been to the University of North Dakota, so I had better get up there and find out so I can answer your question. But to develop a long-term ab initio program would mean that we would have to install state-of-the-art-type simulators which we do not have.

We have some new Frasca simulators which are supportive of our private training, basic pilot training program. I am not familiar with the kinds of simulators he has up there, and so I really cannot answer your question in terms of dollars.

[The following information was subsequently received for the record:]

You asked how much of a capital investment it would require roughly at our campus in Florida in the way of facilities and equipment to enable our pilot graduates to meet airline transition program entry requirements.

Traditionally, except for those entering the military services, our new graduates have spent much of their apprenticeship in single pilot or flight instructing positions because that is what we prepared them for. However, recognizing the current and projected needs of the air transportation industry and the aspirations of our graduates to acquire airline qualification as soon as possible, we are in the process of restructuring our flight degree program to incorporate much more multiplace crew experience and orientation.

These new additions to our training syllabus include airline flight crew techniques, cockpit resource management, flight deck operations and airline pilot proficiency development. Such additions, along with others under review, will require the acquisition of new simulators and training devices, as well as computer-based instructional equipment, and a new training facility to house the space-intensive equipment. Our estimate is that the total capital commitment for our Florida campus will be in the neighborhood of $10 million; and for our Prescott, Arizona campus, approximately $6 million. Attached is a listing of facility and equipment requirements and associated costs.

Aeronautical, science, curriculum revision facility/equipment requirements

	Thousands
Daytona Beach, FL, Campus—Degree students: 1,600:	
1. Aeronautical Science Building (30,000 sq. feet): Classrooms, offices, simulator space, flight operations	$3,000
2. Flight Training Devices:	
8 Single engine with visual systems	2,200
2 Multi-engine/Turboprop with visual systems	1,600
1 Air Carrier cockpit simulator	1,300
3. Computer Based Instructional Laboratory:	
Hardware	1,000
Software	800
Total	9,900
Prescott, AZ Campus—Degree students: 850:	
1. Aeronautical Science Building (20,000 sq. feet)	2,000
2. Flight Training Devices:	
4 Single engine with visual systems	1,100
1 Multi-engine/Turboprop with visual systems	800
1 Air Carrier cockpit simulator	1,300
3. Computer Based Instructional Laboratory:	
Harward	600
Software	400
Total	6,200

Senator MCCAIN. Maybe you could supply a little more for the record in consultation with your staff because it seems to me if what is happening at the University of North Dakota is a model, then perhaps we had better get some handle on what it is going to require to bring up other facilities such as yours.

And I think there are some 120 of them around the country at various stages.

General TALLMAN. I think we must be talking about programs other than just pilot training at the University of North Dakota. In terms of pilots, Embry-Riddle through its Florida campus and its Prescott, Arizona campus is producing the largest number of pilots in any of the collegiate programs today.

Senator MCCAIN. Thank you. Although certainly not at the stage when they are completed as they are at the University of North Dakota, right?

General TALLMAN. Yes, they are at the same stage because UND has not developed their ab initio program to the point yet where they are producing graduates with any greater qualifications than any of the other universities.

Senator MCCAIN. Thank you. Thank you very much, Mr. Chairman.

Senator FORD. Thank you, gentlemen. We appreciate it. If you come in with additional information for the record, we would be delighted to have it. Thank you very much.

Captain Hof, I think you wanted to come back and make a statement as it related to a question that Senator McCain asked you earlier.

We are delighted to ask you back, and we do not want to take too much time. You may proceed, Captain.

Mr. HOF. Thank you very much, Mr. Chairman. I appreciate the opportunity to respond to your question and also to reply to some earlier comments by Senator McCain.

I wanted to get into the record an observation that airline flying and military flying are not mutually exclusive endeavors.

We have a very large number of our former military and naval and Marine Corps pilots who fly actively in the reserve components. As you know, the military has adopted a total force concept in which the reserve and guard units are fully integrated into combat organizations, and the members of those reserve and guard units are fully qualified to perform the missions of the units to which they are assigned.

As an example, I had an opportunity yesterday to visit the U.S.S. *Eisenhower* offshore Norfolk at the invitation of the Navy and watched the training exercises of several of the air groups.

I was interested to note—and you may be interested to find out—that the vice-admiral in charge of the air wing on board in training was an American Airlines captain based in New York.

The executive officer of the fighter training squadron on board from Navy Dallas is also an American Airlines pilot. We have a large number of Air Force pilots who fly everything from the F-16 to the C-5 and the C-141 transport-type airplanes on their days off.

In discussions with the military commanders of some of these units, they are most enthusiastic about having this level of support by foreign military and navy personnel where currently airline pilots because they fully support and are current competent aviators supporting the military mission.

We have heard a lot of discussion today about training civilian pilots, and I would offer one last observation, sir. It seems to me that you can make a civilian pilot relatively easily out of a military pilot. You cannot make a military mission pilot very easily out of a civilian pilot, and I would certainly hope that the cost and benefit

of training additional military pilots would be considered as a part of the possible solution to what is considered a pilot shortage.

The military services have been extending the minimum required active duty period after flight training for some time, and it is now 8 years plus training. That is a total of over 9 years.

It seems to me that a more rational approach to the thing would be to require a 3- to 4-year active duty commitment with a required 3- to 4-year reserve commitment which would give you the best of both worlds in terms of a trained military pilot available to provide additional defense should that be necessary, and you would add to the pool of the civilian pilot group being actively recruited and trained by people who we have heard from here today.

Thank you very much for the opportunity to comment, sir.

Senator FORD. Listening to Captain Duffy, however, he said that those pilots in their first year or so are eager to continue their reserve training because of the additional pay that they would receive from their active duty or their weekend drills or flying their days off.

So, it may not be a very difficult thing to do.

Mr. HOF. Yes, sir. The airline pilot entry today traditionally has never been very good for the first few years of pilot employment. That holds true today.

And, as a supplement to those earnings, a number of former military and naval personnel have engaged in reserve activities. That same thing holds true today, and I see it holding true in the future.

Generally speaking there are a large number of the former military pilots who engage in those reserve activities and go the full 20 years to retirement and then leave their reserve units on a retired basis and continue their airline career.

Senator FORD. Senator McCain.

Senator MCCAIN. Well, Mr. Chairman, I guess it is all in the eye of the beholder as far as pay and salary is concerned. According to a DOD study that says naval aviation—DOD aviation retention study, November 20, 1988, American Airlines salary average second year $44,000 a year. That is significantly higher than a lieutenant commander or roughly comparable, I would think, with a lieutenant commander. A major tenth year $88,000. Captain, $154,000. A general officer's pay is kept at $89,000 a year.

Senator FORD. We do not want them to make any more than we do.

Senator MCCAIN. There is a significant difference there, as you know, Mr. Chairman.

I think the other point here that bothers a lot of us on the Armed Services Committee, particularly in the manpower and personnel area is that it is wonderful to have these airline pilots serving in the reserves and the guard, but what concerns us is if we have to go to full mobilization, most of these airline pilots will not be available because the airlines need to be flown as well.

So, when we talk about this enormous contribution that is made—and indeed it is—we have to consider that airline pilots are part of the entire national mobilization plan so they will not be available in case of an all-out mobilization. And we had better have a lot of those pilots who do other things besides fly airliners. Other-

wise, our ability for the reserves to serve their requirements in case of emergency would be dramatically diminished.

Also, Captain Hof, I think if you talked to the people over at DOD, if we had a 3- or 4-year commitment after investing a million dollars or so in an airline pilot, it makes no sense whatsoever. In fact, there is even contemplation of extending the required tour of duty even further.

We do not know where that point is, but it becomes nonviable. But it is a very complex kind of a situation. But I know of no one who wants to go back to just three or four years of active duty service in return for a million dollar investment on the part of the taxpayer.

I do appreciate your input, and I would like to emphasize that we appreciate very much the service of airline pilots in the Guard and Reserve to which they make a great contribution to our Nation's defense.

Thank you, Mr. Chairman.

Senator FORD. Thank you, Senator McCain. Thank you, Captain, and this hearing is adjourned.

[Whereupon at 12:26 p.m., the committee adjourned, subject to the call of the Chair.]

[The following information was subsequently received for the record:]

STATEMENT OF JOHN BAKER, PRESIDENT, AIRCRAFT OWNERS AND PILOTS ASSOCIATION

Mr. Chairman:

Thank you for the opportunity to submit this brief testimony on the civilian pilot shortage in this country, including a few recommendations on how we might mitigate a problem of increasing proportions.

The Aircraft Owners and Pilots Association is a nationwide not-for-profit membership association of some 295,000 individual aircraft owners and pilots. Our members utilize general aviation aircraft to fulfill their personal and business transportation needs. The issue at hand is the shrinking pool of qualified and experienced airline pilots. Because general aviation is a major training ground for the airlines, we have a substantial interest.

Essentially all general aviation pilots start out in single engine trainers. Financial and other obstacles at this level of learning filter throughout the industry. The airlines, when they cannot fill their requirements from the pool of general aviation trained pilots, look to the supply of military pilots to meet their hiring needs. This alternative is more costly in light of the major taxpayer investment to specially train a military aviator.

The reasons for the pilot shortage vary. Spiraling costs are a factor, to be sure. To name a few others, the airline industry has experienced explosive growth since deregulation. A majority of our war era trained pilots who moved on to the

airlines thirty or forty years ago are now approaching the mandatory retirement age. The armed forces are understandably working harder to retain pilots in the military. Combine these factors with some startling statistics about the pilot population as a whole, and the picture is bleak.

The total number of active pilots in the country declined by 16 percent between 1980 and 1988. The number of active student and private pilots was down 22 percent during the same period. Between 1978 and 1981, an average of 119,000 individuals started to learn to fly each year. But in 1988, only 80,000 student starts were recorded. Worse yet, fewer student pilots are completing their training and actually obtaining a private pilot certificate - 68,000 in 1982 compared with 58,000 in 1987.

As you consider ways to more efficiently allocate public funds for pilot training that may discourage air carriers from soliciting the military for qualified pilots, the Committee should also consider methods of encouraging more people to become involved in general aviation to maintain a pool of qualified pilots from which the airlines can draw.

Cost is the single most daunting aspect of training. The FAA has helped recently to address the problem in one sense by establishing the new recreational pilot certificate, a proposal initiated by AOPA in 1978. Requirements for the recreational pilot certificate are sufficient to ensure safety, but are not as extensive as those required for a private pilot certificate. In return, strict operational limits are imposed. A

recreational pilot must fly during daylight hours in good weather near his home airport (with no control tower) and in airspace that doesn't require two-way radio communications. We view the recreational pilot certificate as a lower-cost entry level alternative to the private pilot certificate. We hope it will result in more people becoming interested in learning to fly, who will go on to earn additional certificates and ratings.

Another incentive advocated by AOPA is veterans' educational assistance for flight training. These GI bill benefits were terminated by Congress under the Omnibus Budget Reconciliation Act, enacted in 1981. We believe their reestablishment, with safeguards to ensure they are properly applied towards an aviation vocation (such as a private pilot certificate prerequisite and a 60 percent rate of reimbursement) would serve a dual purpose in both the veterans and aviation arenas.

We favor certain other ideas commonly discussed as possible antidotes to the drastic pilot shortage that is impending. One is relaxation of the mandatory retirement rule at age 60 for airline pilots. We should be able to rely on medical certification and recurrent training programs to detect a pilot's individual competence, not an arbitrary retirement age. Besides, there is no substitute for aviation experience -- just ask the brave pilots and passengers who survived the recent Sioux City accident.

Another proposal with potential is a national civilian pilot training academy. At the least, the idea is a good starting

point for discussion. It's possible that other government-sponsored or privately funded incentives, such as educational assistance for veterans' flight training, could be channelled through this or other approved educational institutions. In this manner, benefits also could be monitored more effectively.

Above all else, we are encouraged by the Committee's willingness to delve into this problem before it becomes too dire to cope with. Naturally, we're delighted by any attempts to encourage people to fly. It's the business we're in. But more important, this issue truly has broad implications for the economic and social well-being of the nation.

I hope you will call on us in the future whenever these alternatives are discussed in greater detail. Thank you again, Mr. Chairman.

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August 10, 1989

The Honorable Wendell H. Ford
Chairman
Subcommittee on Aviation
Senate Committee on Science and Transportation
United States Senate
428 Hart Office Building
Washington, D.C. 20510

For the Record: August 3, 1989 Subcommittee on Aviation, Hearing on Pilot Shortage in the United States

Dear Senator Ford:

The General Aviation Taskforce is a coalition of more than 800 companies which is concerned with the economic welfare of the General Aviation industry and through voluntary contributions, has initiated an advertising and public relations effort to increase the awareness of flight training and other General Aviation services.

Deregulation of the air transportation industry marked its 10th anniversary last year amid the glowing pronouncements of its undeniable success story. It is doubtful that deregulation's staunchest advocates ten years ago imagined the extent of the positive impact these changes would have on the American traveling public.

At the pocketbook level, the Federal Trade Commission has speculated that the American consumer has saved over $100 billion as a result of deregulation. Understandably these lower costs have created an explosion in the demand for air carrier transportation. The average American no longer sees an airline ticket as the exclusive prerogative of the wealthy or a businessman's perk paid for by his company's expense account. Air transportation today has become a common mode of transportation with the FAA predicting that by the year 2000, there will be nearly 3.5 times as many passengers as in 1977, the year before deregulation.

Yet as the passenger volume has increased, we in the General Aviation industry have watched with the increasing frustration as the infrastructure has failed to keep pace or in some cases begun to collapse under the weight of overcrowding. While the debate for correcting these problems usually centers on building more airports or a more efficient air traffic control system, in recent months a more critical kind of shortage has become apparent. This kind of shortage is not concerned with the lack of runways or air traffic controllers but it is one that could have just as serious implications for our industry and eventually the national defense of our country. This is the shortage of qualified pilots needed to operate our industry's expanding fleet of aircraft.

The last several years have witnessed more pilot hiring than ever before in U.S. commercial aviation history. After World War II, commercial airline hiring remained relatively stable at an average rate of little more than 500 pilots a year with the exception of two surge periods in 1965 and 1978. But since 1983, hiring by the major airlines has

increased dramatically to an average of 6,000 a year, according to the Future Aviation Professionals of America. Hiring by regional carriers also increased to an average of 3,000 to 4,000 per year for an overall total of roughly 10,000 new pilots annually. FAPA predicts that this demand level will continue at least through the end of the century.

Traditionally, civil aviation has attracted a majority of its pilots from the military pilot pool. But the demand has become so great in recent years that shortages of qualified pilots are even being felt within the Air Force and the Navy. For example, the retention rates among Air Force pilots with 6-12 years of service has dropped from 72% in Fiscal 1984 to 48% in Fiscal 1987. The rate for Navy pilots has dropped from 54% to 35% in the same period. Both rates are well below the minimum of 62% and 48% established by the two services respectively. For the armed services to train a fighter pilot to the point where he is fully ready for combat takes more than five years and an investment of between $5.3 and $7.5 million. To expect to rely on this pool for additional civil aviation pilots not only drives up our defense costs but, quite frankly, also puts our military at a disadvantage in defending our country.

We in the aviation community must explore other avenues to build the pilot pool in the U.S. Significantly reduce the number of doctors in a country and you can expect that the general health of that population will suffer. Eliminate a large proportion of the educators from a nation and the literacy will soon diminish. Fail to train an adequate number of pilots to operate our expanding aircraft fleet and we can expect growth of our industry to come to a screeching halt. It is an undeniable fact that pilots are an important natural resource to any nation. We as industry representatives could be completely successful in freeing every penny from the Aviation Trust Fund and building the biggest and most advanced aviation transportation system in the world and yet ultimately fail if we don't provide for the qualified personnel to operate the air carriers within the system.

Members of The General Aviation Taskforce recognized the implications that these statistics have for the entire aviation community. Since April 1988, the Taskforce has been developing a program that actively promotes the perception that learning to fly is an exciting hobby which is both safe and an economically viable mode of transportation. It is the industry's belief that as more people become aware of the accessibility of flight instruction more people will take advantage of these programs. As the number of students increase, the industry is convinced that more of those younger students will consider transforming this avocation into a vocation.

But no one in our industry is naive enough to believe that this single program is the exclusive answer to the concern. Government support is needed as well. The concept of the federal government assisting in the growth of civil aviation should not be considered an unconventional idea by anyone. In the Federal Aviation Act of 1958, Congress mandated that the FAA should provide for "the promotion of civil aviation in such a manner as to best foster its development and safety. . ."

In summary Congress should understand that General Aviation remains committed to increasing the awareness of the public to the flight training services our industry offers in order that we may enhance the effectiveness of any measures you may implement to address this significant problem. Without our combined efforts now, the United States, in the 21st Century could be faced with the reality of of having the most modern air transportation system in the world and not enough people to operate it.

The members of The General Aviation Taskforce are at your disposal to explore specific actions that might be taken in expanding the nation's pilot pool. We urge you to give this matter careful consideration.

Sincerely,

Lawrence L. Burian
Administrator